OIPE
AUG 22 2002
PATENT & TRADEMARK OFFICE
JC681

PATENT
Attorney Docket No. 72978

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): LI et al.

Appln No.: 10/075,105

Filed: February 13, 2002

For: A BI-DIRECTIONAL DUAL PROMOTER COMPLEX WITH ENHANCED PROMOTER ACTIVITY FOR TRANSGENE EXPRESSION IN EUKARYOTES

Group Art Unit: 1645

Examiner: Not Yet Known

CERTIFICATE OF MAILING

I hereby certify that this paper is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on this date.

08/19/02
Date

James P. Krueger
Registration No. 35, 234
Attorney for Applicant(s)

TRANSMITTAL OF FORMAL DRAWINGS

Box MISSING PARTS
Commissioner of Patents and Trademarks
ATTENTION: Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

To correct informalities in the drawings as noted in the Notice to File Missing Parts of Nonprovisional Application dated April 18, 2002, Applicants submit herewith formal drawings (Figure 1 -27 on 37 sheets) for this application. The two-month period of response set in the Notice of Missing Parts expired on June 18, 2002, as a result this submission includes a two-month Petition for Extension of Time.

Respectfully submitted,
FITCH, EVEN, TABIN & FLANNERY

By:
James P. Krueger
Registration No. 25,747

Date: August 19, 2002
120 South LaSalle Street
Suite 1600
Chicago, IL 60603-3406
Telephone: (312) 577-7000
Facsimile: (312) 577-7007

PATENT & TRADEMARK OFFICE
AUG. 22, 2002
JC18
OIPE

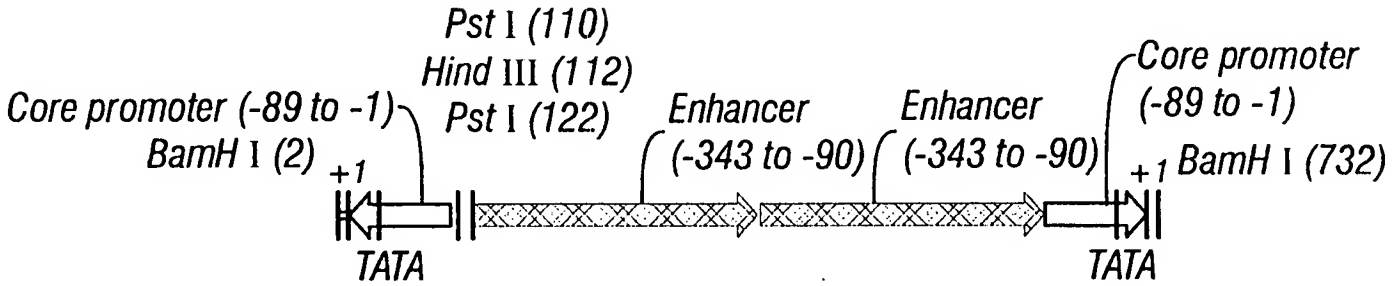


FIG. 1

PATENT & TRADEMARK OFFICE
AUG 22 2002
OIPE
JC18

BamHI

```
  1  GGATCCAGCG TGTCCTCTCC AAATGAAATG AACTTCCTTA TATAGAGGAA GGGTCTTGCG AAGGATAGTG GGATTGTGCG
     CCTAGGTCGC ACAGGAGAGG TTTACTTTAC TTGAAGGAAT ATATCTCCTT CCCAGAACGC TTCCTATCAC CCTAACACGC
-------------------------------------------------------------------------------------------
                                PstI  HindIIIPstI
 81  TCATCCCTTA CGTCAGTGGA GATACTGCAG AAGCTTCTGC AGTGAGACTT TTCAACAAAG GGTAATATCG GGAAACCTCC
     AGTAGGGAAT GCAGTCACCT CTATGACGTC TTCGAAGACG TCACTCTGAA AAGTTGTTTC CCATTATAGC CCTTTGGAGG
-------------------------------------------------------------------------------------------
161  TCGGATTCCA TTGCCCAGCT ATCTGTCACT TCATCAAAAG GACAGTAGAA AAGGAAGGTG GCACCTACAA ATGCCATCAT
     AGCCTAAGGT AACGGGTCGA TAGACAGTGA AGTAGTTTTC CTGTCATCTT TTCCTTCCAC CGTGGATGTT TACGGTAGTA
-------------------------------------------------------------------------------------------
241  TGCGATAAAG GAAAGGCTAT CGTTCAAGAT GCCTCTGCCG ACAGTGGTCC CAAAGATGGA CCCCCACCCA CGAGGAGCAT
     ACGCTATTTC CTTTCCGATA GCAAGTTCTA CGGAGACGGC TGTCACCAGG GTTTCTACCT GGGGGTGGGT GCTCCTCGTA
-------------------------------------------------------------------------------------------
321  CGTGGAAAAA GAAGACGTTC CAACCACGTC TTCAAAGCAA GTGGATTGAT GTGATTGCAG TGAGACTTTT CAACAAAGGG
     GCACCTTTTT CTTCTGCAAG GTTGGTGCAG AAGTTTCGTT CACCTAACTA CACTAACGTC ACTCTGAAAA GTTGTTTCCC
-------------------------------------------------------------------------------------------
401  TAATATCGGG AAACCTCCTC GGATTCCATT GCCCAGCTAT CTGTCACTTC ATCAAAAGGA CAGTAGAAAA GGAAGGTGGC
     ATTATAGCCC TTTGGAGGAG CCTAAGGTAA CGGGTCGATA GACAGTGAAG TAGTTTTCCT GTCATCTTTT CCTTCCACCG
-------------------------------------------------------------------------------------------
481  ACCTACAAAT GCCATCATTG CGATAAAGGA AAGGCTATCG TTCAAGATGC CTCTGCCGAC AGTGGTCCCA AAGATGGACC
     TGGATGTTTA CGGTAGTAAC GCTATTTCCT TTCCGATAGC AAGTTCTACG GAGACGGCTG TCACCAGGGT TTCTACCTGG
-------------------------------------------------------------------------------------------
```


FIG. 2A

PATENT & TRADEMARK OFFICE AUG 27 2002 OIPE JC18

```
561  CCCACCCACG AGGAGCATCG TGGAAAAAGA AGACGTTCCA ACCACGTCTT CAAAGCAAGT GGATTGATGT GATATCTCCA
     GGGTGGGTGC TCCTCGTAGC ACCTTTTTCT TCTGCAAGGT TGGTGCAGAA GTTTCGTTCA CCTAACTACA CTATAGAGGT
-------------------------------------------------------------------------------------------
641  CTGACGTAAG GGATGACGCA CAATCCCACT ATCCTTCGCA AGACCCTTCC TCTATATAAG GAAGTTCATT TCATTTGGAG
     GACTGCATTC CCTACTGCGT GTTAGGGTGA TAGGAAGCGT TCTGGGAAGG AGATATATTC CTTCAAGTAA AGTAAACCTC
-------------------------------------------------------------------------------------------
                BamHI
                ~~~~~~
721  AGGACACGCT GGATCC     Seq. ID No. 1
     TCCTGTGCGA CCTAGG     Seq. ID No. 2
-------------------------------------------------------------------------------------------
```

FIG. 2B

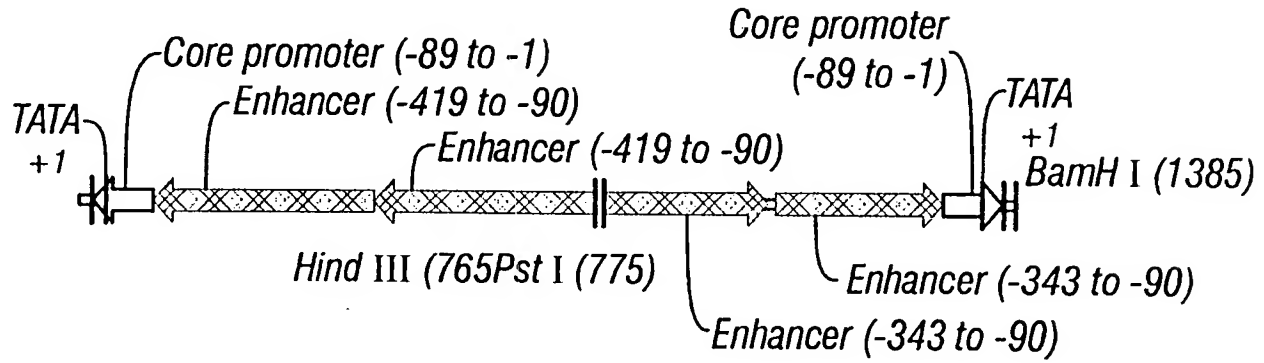


FIG. 3

PATENT & TRADEMARK OFFICE
AUG. 2, 2002
JC18
OIPE

SnaBI

Seq. ID No. 3

1 TACGTACAGC GTGTCCTCTC CAAATGAAAT GAACTTCCTT ATATAGAGGA AGGGTCTTGC GAAGGATAGT GGGATTGTGC

Seq. ID No. 4

ATGCATGTCG CACAGGAGAG GTTTACTTTA CTTGAAGGAA TATATCTCCT TCCCAGAACG CTTCCTATCA CCCTAACACG

---

81 GTCATCCCTT ACGTCAGTGG AGATATCACA TCCATCCACT TGCTTTGAAG ACGTGGTTGG AACGTCTTCT TTTTCCACGA
CAGTAGGGAA TGCAGTCACC TCTATAGTGT AGTTAGGTGA ACGAAACTTC TGCACCAACC TTGCAGAAGA AAAAGGTGCT

---

161 TGCTCCTCGT GGGTGGGGGT CCATCTTTGG GACCACTGTC GGCAGAGGCA TCTTCAACGA TGGCCTTTCC TTTATCGCAA
ACGAGGAGCA CCCACCCCCA GGTAGAAACC CTGGTGACAG CCGTCTCCGT AGAAGTTGCT ACCGGAAAGG AAATAGCGTT

---

241 TGATGGCATT TGTAGGAGCC ACCTTCCTTT TCCACTATCT TCACAATAAA GTGACAGATA GCTGGGCAAT GGAATCCGAG
ACTACCGTAA ACATCCTCGG TGGAAGGAAA AGGTGATAGA AGTGTTATTT CACTGTCTAT CGACCCGTTA CCTTAGGCTC

---

321 GAGGTTTCCG GATATTACCC TTTGTTGAAA AGTCTCAATT GCCCTTTGGT CTTCTGAGAC TGTATCTTTG ATATTTTTGG
CTCCAAAGGC CTATAATGGG AAACAACTTT TCAGAGTTAA CGGGAAACCA GAAGACTCTG ACATAGAAAC TATAAAAACC

---

401 AGTAGACAAG TGTGTCGTGC TCCACCATGT TGATTCACAT CAATCCACTT GCTTTGAAGA CGTGGTTGGA ACGTCTTCTT
TCATCTGTTC ACACAGCACG AGGTGGTACA ACTAAGTGTA GTTAGGTGAA CGAAACTTCT GCACCAACCT TGCAGAAGAA

---

481 TTTCCACGAT GCTCCTCGTG GGTGGGGGTC CATCTTTGGG ACCACTGTCG GCAGAGGCAT CTTCAACGAT GGCCTTTCCT
AAAGGTGCTA CGAGGAGCAC CCACCCCCAG GTAGAAACCC TGGTGACAGC CGTCTCCGTA GAAGTTGCTA CCGGAAAGGA

FIG. 4A

PATENT & TRADEMARK OFFICE AUG. 2, 2004 JC18

```
561  TTATCGCAAT GATGGCATTT GTAGGAGCCA CCTTCCTTTT CCACTATCTT CACAATAAAG TGACAGATAG CTGGGCAATG
     AATAGCGTTA CTACCGTAAA CATCCTCGGT GGAAGGAAAA GGTGATAGAA GTGTTATTTC ACTGTCTATC GACCCGTTAC
-------------------------------------------------------------------------------------------

641  GAATCCGAGG AGGTTTCCGG ATATTACCCT TTGTTGAAAA GTCTCAATTG CCCTTTGGTC TTCTGAGACT GTATCTTTGA
     CTTAGGCTCC TCCAAAGGCC TATAATGGGA AACAACTTTT CAGAGTTAAC GGGAAACCAG AAGACTCTGA CATAGAAACT
-------------------------------------------------------------------------------------------

                                                HindIIIPstI
                                                ~~~~~~~~~~~

721  TATTTTTGGA GTAGACAAGT GTGTCGTGCT CCACCATGTT GATAAGCTTC TGCAGTGAGA CTTTTCAACA AAGGGTAATA
     ATAAAAACCT CATCTGTTCA CACAGCACGA GGTGGTACAA CTATTCGAAG ACGTCACTCT GAAAAGTTGT TTCCCATTAT
-------------------------------------------------------------------------------------------

801  TCGGGAAACC TCCTCGGATT CCATTGCCCA GCTATCTGTC ACTTCATCAA AAGGACAGTA GAAAAGGAAG GTGGCACCTA
     AGCCCTTTGG AGGAGCCTAA GGTAACGGGT CGATAGACAG TGAAGTAGTT TTCCTGTCAT CTTTTCCTTC CACCGTGGAT
-------------------------------------------------------------------------------------------

881  CAAATGCCAT CATTGCGATA AAGGAAAGGC TATCGTTCAA GATGCCTCTG CCGACAGTGG TCCCAAAGAT GGACCCCCAC
     GTTTACGGTA GTAACGCTAT TTCCTTTCCG ATAGCAAGTT CTACGGAGAC GGCTGTCACC AGGGTTTCTA CCTGGGGGTG
-------------------------------------------------------------------------------------------

961  CCACGAGGAG CATCGTGGAA AAAGAAGACG TTCCAACCAC GTCTTCAAAG CAAGTGGATT GATGTGATTG CAGTGAGACT
     GGTGCTCCTC GTAGCACCTT TTTCTTCTGC AAGGTTGGTG CAGAAGTTTC GTTCACCTAA CTACACTAAC GTCACTCTGA
-------------------------------------------------------------------------------------------

1041 TTTCAACAAA GGGTAATATC GGGAAACCTC CTCGGATTCC ATTGCCCAGC TATCTGTCAC TTCATCAAAA GGACAGTAGA
     AAAGTTGTTT CCCATTATAG CCCTTTGGAG GAGCCTAAGG TAACGGGTCG ATAGACAGTG AAGTAGTTTT CCTGTCATCT
-------------------------------------------------------------------------------------------

1121 AAAGGAAGGT GGCACCTACA AATGCCATCA TTGCGATAAA GGAAAGGCTA TCGTTCAAGA TGCCTCTGCC GACAGTGGTC
     TTTCCTTCCA CCGTGGATGT TTACGGTAGT AACGCTATTT CCTTTCCGAT AGCAAGTTCT ACGGAGACGG CTGTCACCAG
-------------------------------------------------------------------------------------------
```

FIG. 4B

PATENT & TRADEMARK OFFICE AUG. 22 2002 JC943 OIPE

```
1201  CCAAAGATGG ACCCCCACCC ACGAGGAGCA TCGTGGAAAA AGAAGACGTT CCAACCACGT CTTCAAAGCA AGTGGATTGA
      GGTTTCTACC TGGGGGTGGG TGCTCCTCGT AGCACCTTTT TCTTCTGCAA GGTTGGTGCA GAAGTTTCGT TCACCTAACT
------------------------------------------------------------------------------------------

1281  TGTGATATCT CCACTGACGT AAGGGATGAC GCACAATCCC ACTATCCTTC GCAAGACCCT TCCTCTATAT AAGGAAGTTC
      ACACTATAGA GGTGACTGCA TTCCCTACTG CGTGTTAGGG TGATAGGAAG CGTTCTGGGA AGGAGATATA TTCCTTCAAG
------------------------------------------------------------------------------------------
```

FIG. 4C

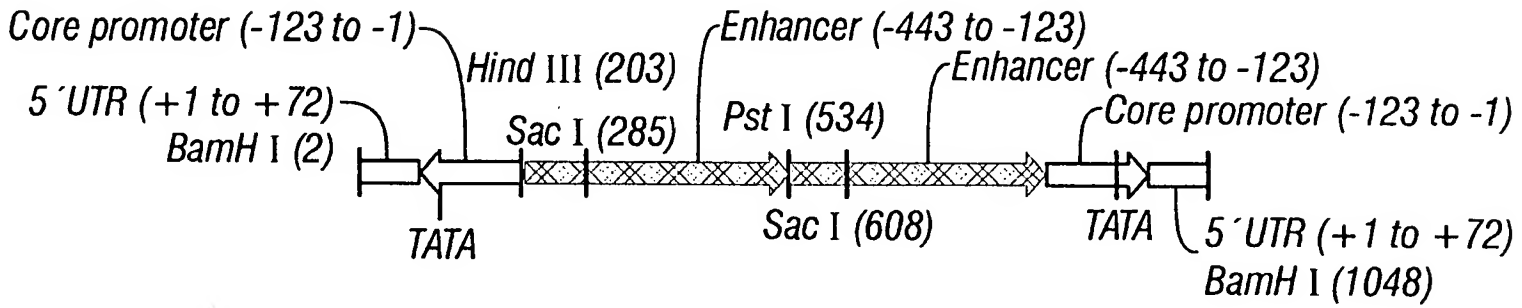


FIG. 5

PATENT & TRADEMARK OFFICE AUG 22 2002 OIPE

BamHI

```
  1 GGATCCACAA ACTTACAAAT TTCTCTGAAG TTGTATCCTC AGTACTTCAA AGAAAATAGC TTACACCAAA TTTTTTCTTG
    CCTAGGTGTT TGAATGTTTA AAGAGACTTC AACATAGGAG TCATGAAGTT TCTTTTATCG AATGTGGTTT AAAAAAGAAC
---------------------------------------------------------------------------------------------
 81 TTTTCACAAA TGCCGAACTT GGTTCCTTAT ATAGGAAAAC TCAAGGGCAA AAATGACACG GAAAAATATA AAAGGATAAG
    AAAAGTGTTT ACGGCTTGAA CCAAGGAATA TATCCTTTTG AGTTCCCGTT TTTACTGTGC CTTTTTATAT TTTCCTATTC
---------------------------------------------------------------------------------------------
```

HindIII

```
161 TAGTGGGGGA TAAGATTCCT TTGTGATAAG GTTACTTTCC GAAGCTTCCA GAAGGTAATT ATCCAAGATG TAGCATCAAG
    ATCACCCCCT ATTCTAAGGA AACACTATTC CAATGAAAGG CTTCGAAGGT CTTCCATTAA TAGGTTCTAC ATCGTAGTTC
---------------------------------------------------------------------------------------------
```

SacI

```
241 AATCCAATGT TTACGGGAAA AACTATGGAA GTATTATGTG AGCTCAGCAA GAAGCAGATC AATATGCGGC ACATATGCAA
    TTAGGTTACA AATGCCCTTT TTGATACCTT CATAATACAC TCGAGTCGTT CTTCGTCTAG TTATACGCCG TGTATACGTT
---------------------------------------------------------------------------------------------
321 CCTATGTTCA AAAATGAAGA ATGTACAGAT ACAAGATCCT ATACTGCCAG AATACGAAGA AGAATACGTA GAAATTGAAA
    GGATACAAGT TTTTACTTCT TACATGTCTA TGTTCTAGGA TATGACGGTC TTATGCTTCT TCTTATGCAT CTTTAACTTT
---------------------------------------------------------------------------------------------
401 AAGAAGAACC AGGCGAAGAA AAGAATCTTG AAGACGTAAG CACTGACGAC AACAATGAAA AGAAGAAGAT AAGGTCGGTG
    TTCTTCTTGG TCCGCTTCTT TTCTTAGAAC TTCTGCATTC GTGACTGCTG TTGTTACTTT TCTTCTTCTA TTCCAGCCAC
---------------------------------------------------------------------------------------------
```


FIG. 6A

PATENT & TRADEMARK OFFICE AUG 22 2002 OIPE JC181

PstI

481 ATTGTGAAAG AGACATAGAG GACACATGTA AGGTGGAAAA TGTAAGGGCT GCAGAAGGTA ATTATCCAAG ATGTAGCATC
TAACACTTTC TCTGTATCTC CTGTGTACAT TCCACCTTTT ACATTCCCGA CGTCTTCCAT TAATAGGTTC TACATCGTAG

SacI

561 AAGAATCCAA TGTTTACGGG AAAAACTATG GAAGTATTAT GTGAGCTCAG CAAGAAGCAG ATCAATATGC GGCACATATG
TTCTTAGGTT ACAAATGCCC TTTTTGATAC CTTCATAATA CACTCGAGTC GTTCTTCGTC TAGTTATACG CCGTGTATAC

641 CAACCTATGT TCAAAAATGA AGAATGTACA GATACAAGAT CCTATACTGC CAGAATACGA AGAAGAATAC GTAGAAATTG
GTTGGATACA AGTTTTTACT TCTTACATGT CTATGTTCTA GGATATGACG GTCTTATGCT TCTTCTTATG CATCTTTAAC

721 AAAAAGAAGA ACCAGGCGAA GAAAAGAATC TTGAAGACGT AAGCACTGAC GACAACAATG AAAAGAAGAA GATAAGGTCG
TTTTTCTTCT TGGTCCGCTT CTTTTCTTAG AACTTCTGCA TTCGTGACTG CTGTTGTTAC TTTTCTTCTT CTATTCCAGC

801 GTGATTGTGA AAGAGACATA GAGGACACAT GTAAGGTGGA AAATGTAAGG GCGGAAAGTA ACCTTATCAC AAAGGAATCT
CACTAACACT TTCTCTGTAT CTCCTGTGTA CATTCCACCT TTTACATTCC CGCCTTTCAT TGGAATAGTG TTTCCTTAGA

881 TATCCCCCAC TACTTATCCT TTTATATTTT TCCGTGTCAT TTTTGCCCTT GAGTTTTCCT ATATAAGGAA CCAAGTTCGG
ATAGGGGGTG ATGAATAGGA AAATATAAAA AGGCACAGTA AAAACGGGAA CTCAAAAGGA TATATTCCTT GGTTCAAGCC

961 CATTTGTGAA AACAAGAAAA AATTTGGTGT AAGCTATTTT CTTTGAAGTA CTGAGGATAC AACTTCAGAG AAATTTGTAA
GTAAACACTT TTGTTCTTTT TTAAACCACA TTCGATAAAA GAAACTTCAT GACTCCTATG TTGAAGTCTC TTTAAACATT

FIG. 6B

PATENT & TRADEMARK OFFICE AUG 2 2 2002 OIPE JC181

	BamHI	
1041	GTTTGTGGAT CC	*Seq. ID No. 5*
	CAAACACCTA GG	*Seq. ID No. 6*

FIG. 6C

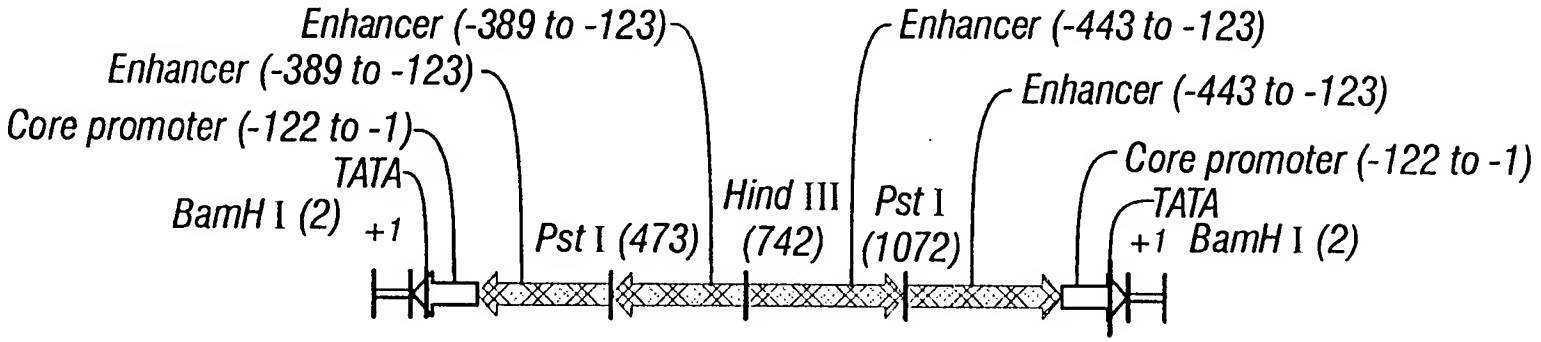


FIG. 7

PATENT & TRADEMARK OFFICE AUG. 2 1 2002 OIPE JC181


```
      BamHI
      ~~~~~~
  1   GGATCCACAA ACTTACAAAT TTCTCTGAAG TTGTATCCTC AGTACTTCAA AGAAAATAGC TTACACCAAA TTTTTTCTTG
      CCTAGGTGTT TGAATGTTTA AAGAGACTTC AACATAGGAG TCATGAAGTT TCTTTTATCG AATGTGGTTT AAAAAAGAAC
-------------------------------------------------------------------------------------------
 81   TTTTCACAAA TGCCGAACTT GGTTCCTTAT ATAGGAAAAC TCAAGGGCAA AAATGACACG GAAAAATATA AAAGGATAAG
      AAAAGTGTTT ACGGCTTGAA CCAAGGAATA TATCCTTTTG AGTTCCCGTT TTTACTGTGC CTTTTTATAT TTTCCTATTC
-------------------------------------------------------------------------------------------
161   TAGTGGGGGA TAAGATTCCT TTGTGATAAG GTTACTTTCC GCCCTTACAT TTTCCACCTT ACATGTGTCC TCTATGTCTC
      ATCACCCCCT ATTCTAAGGA AACACTATTC CAATGAAAGG CGGGGATGTA AAAGGTGGAA TGTACACAGG AGATACAGAG
-------------------------------------------------------------------------------------------
241   TTTCACAATC ACCGACCTTA TCTTCTTCTT TTCATTGTTG TCGTCAGTGC TTACGTCTTC AAGATTCTTT TCTTCGCCTG
      AAAGTGTTAG TGGCTGGAAT AGAAGAAGAA AAGTAACAAC AGCAGTCACG AATGCAGAAG TTCTAAGAAA AGAAGCGGAC
-------------------------------------------------------------------------------------------
321   GTTCTTCTTT TTCAATTTCT ACGTATTCTT CTTCGTATTC TGGCAGTATA GGATCTTGTA TCTGTACATT CTTCATTTTT
      CAAGAAGAAA AAGTTAAAGA TGCATAAGAA GAAGCATAAG ACCGTCATAT CCTAGAACAT AGACATGTAA GAAGTAAAAA
-------------------------------------------------------------------------------------------
                                              SacI                PstI
                                              ~~~~~~              ~~~~~~~
401   GAACATAGGT TGCATATGTG CCGCATATTG ATCTGCTTCT TGCTGAGCTC ACATAATACT TCCATAGCTG CAGCCCTTAC
      CTTGTATCCA ACGTATACAC GGCGTATAAC TAGACGAAGA ACGACTCGAG TGTATTATGA AGGTATCGAC GTCGGGAATG
-------------------------------------------------------------------------------------------
481   ATTTTCCACC TTACATGTGT CCTCTATGTC TCTTTCACAA TCACCGACCT TATCTTCTTC TTTTCATTGT TGTCGTCAGT
      TAAAAGGTGG AATGTACACA GGAGATACAG AGAAAGTGTT AGTGGCTGGA ATAGAAGAAG AAAAGTAACA ACAGCAGTCA
-------------------------------------------------------------------------------------------
```

FIG. 8A

PATENT & TRADEMARK OFFICE AUG 22 2002 OIPE 3C1800

```
561  GCTTACGTCT TCAAGATTCT TTTCTTCGCC TGGTTCTTCT TTTTCAATTT CTACGTATTC TTCTTCGTAT TCTGGCAGTA
     CGAATGCAGA AGTTCTAAGA AAAGAAGCGG ACCAAGAAGA AAAAGTTAAA GATGCATAAG AAGAAGCATA AGACCGTCAT
-------------------------------------------------------------------------------------------

                                                                                      SacI
                                                                                      ~~~~
641  TAGGATCTTG TATCTGTACA TTCTTCATTT TTGAACATAG GTTGCATATG TGCCGCATAT TGATCTGCTT CTTGCTGAGC
     ATCCTAGAAC ATAGACATGT AAGAAGTAAA AACTTGTATC CAACGTATAC ACGGCGTATA ACTAGACGAA GAACGACTCG
-------------------------------------------------------------------------------------------

     SacI                 HindIII
     ~~                   ~~~~~~
721  TCACATAATA CTTCCATAGG AAGCTTCAGA AGGTAATTAT CCAAGATGTA GCATCAAGAA TCCAATGTTT ACGGGAAAAA
     AGTGTATTAT GAAGGTATCC TTCGAAGTCT TCCATTAATA GGTTCTACAT CGTAGTTCTT AGGTTACAAA TGCCCTTTTT
-------------------------------------------------------------------------------------------

                       SacI
                       ~~~~~~~
801  CTATGGAAGT ATTATGTGAG CTCAGCAAGA AGCAGATCAA TATGCGGCAC ATATGCAACC TATGTTCAAA AATGAAGAAT
     GATACCTTCA TAATACACTC GAGTCGTTCT TCGTCTAGTT ATACGCCGTG TATACGTTGG ATACAAGTTT TTACTTCTTA
-------------------------------------------------------------------------------------------

881  GTACAGATAC AAGATCCTAT ACTGCCAGAA TACGAAGAAG AATACGTAGA AATTGAAAAA GAAGAACCAG GCGAAGAAAA
     CATGTCTATG TTCTAGGATA TGACGGTCTT ATGCTTCTTC TTATGCATCT TTAACTTTTT CTTCTTGGTC CGCTTCTTTT
-------------------------------------------------------------------------------------------

961  GAATCTTGAA GACGTAAGCA CTGACGACAA CAATGAAAAG AAGAAGATAA GGTCGGTGAT TGTGAAAGAG ACATAGAGGA
     CTTAGAACTT CTGCATTCGT GACTGCTGTT GTTACTTTTC TTCTTCTATT CCAGCCACTA ACACTTTCTC TGTATCTCCT
-------------------------------------------------------------------------------------------

                                PstI
                                ~~~~~~~
```

FIG. 8B

PATENT & TRADEMARK OFFICE AUG 22 2002 OIPE JC181

```
1041  CACATGTAAG GTGGAAAATG TAAGGGCTGC AGAAGGTAAT TATCCAAGAT GTAGCATCAA GAATCCAATG TTTACGGGAA
      GTGTACATTC CACCTTTTAC ATTCCCGACG TCTTCCATTA ATAGGTTCTA CATCGTAGTT CTTAGGTTAC AAATGCCCTT
-------------------------------------------------------------------------------------------

                              SacI
                              ~~~~~~

1121  AAACTATGGA AGTATTATGT GAGCTCAGCA AGAAGCAGAT CAATATGCGG CACATATGCA ACCTATGTTC AAAAATGAAG
      TTTGATACCT TCATAATACA CTCGAGTCGT TCTTCGTCTA GTTATACGCC GTGTATACGT TGGATACAAG TTTTTACTTC
-------------------------------------------------------------------------------------------

1201  AATGTACAGA TACAAGATCC TATACTGCCA GAATACGAAG AAGAATACGT AGAAATTGAA AAAGAAGAAC CAGGCGAAGA
      TTACATGTCT ATGTTCTAGG ATATGACGGT CTTATGCTTC TTCTTATGCA TCTTTAACTT TTTCTTCTTG GTCCGCTTCT
-------------------------------------------------------------------------------------------

1281  AAAGAATCTT GAAGACGTAA GCACTGACGA CAACAATGAA AAGAAGAAGA TAAGGTCGGT GATTGTGAAA GAGACATAGA
      TTTCTTAGAA CTTCTGCATT CGTGACTGCT GTTGTTACTT TTCTTCTTCT ATTCCAGCCA CTAACACTTT CTCTGTATCT
-------------------------------------------------------------------------------------------

1361  GGACACATGT AAGGTGGAAA ATGTAAGGGC GGAAAGTAAC CTTATCACAA AGGAATCTTA TCCCCCACTA CTTATCCTTT
      CCTGTGTACA TTCCACCTTT TACATTCCCG CCTTTCATTG GAATAGTGTT TCCTTAGAAT AGGGGGTGAT GAATAGGAAA
-------------------------------------------------------------------------------------------

1441  TATATTTTTC CGTGTCATTT TTGCCCTTGA GTTTTCCTAT ATAAGGAACC AAGTTCGGCA TTTGTGAAAA CAAGAAAAAA
      ATATAAAAAG GCACAGTAAA AACGGGAACT CAAAAGGATA TATTCCTTGG TTCAAGCCGT AAACACTTTT GTTCTTTTTT
-------------------------------------------------------------------------------------------

                                                                BamHI
                                                                ~~~~~~

1521  TTTGGTGTAA GCTATTTTCT TTGAAGTACT GAGGATACAA CTTCAGAGAA ATTTGTAAGT TTGTGGATCC    Seq. ID No. 7
      AAACCACATT CGATAAAAGA AACTTCATGA CTCCTATGTT GAAGTCTCTT TAAACATTCA AACACCTAGG    Seq. ID No. 8
-------------------------------------------------------------------------------------------
```


FIG. 8C

OIPE
AUG 22 2002
PATENT & TRADEMARK OFFICE
JC#81

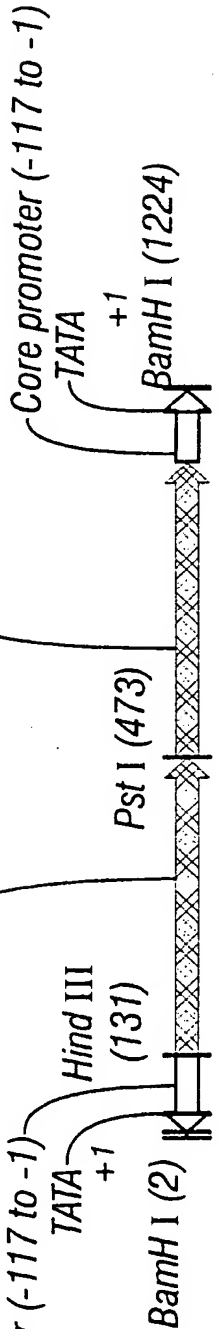


FIG. 9

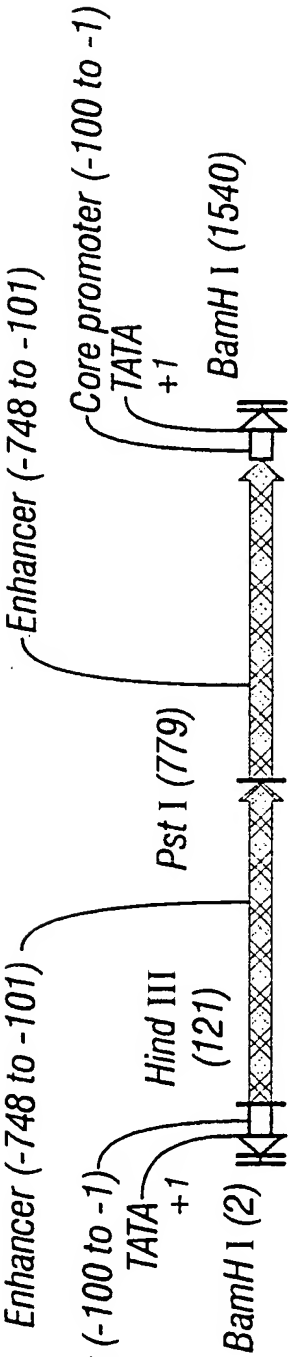


FIG. 11

PATENT & TRADEMARK OFFICE
AUG 22 2002
OIPE
JC181

BamHI

```
1   GGATCCTTGT TTTCAAAGCG GAGAGGAAAA TATATGAATT TATATAGGCG GGTTTATCTC TTACAACTTT ATTTTCGGCC
    CCTAGGAACA AAAGTTTCGC CTCTCCTTTT ATATACTTAA ATATATCCGC CCAAATAGAG AATGTTGAAA TAAAAGCCGG
```

HindIII

```
81  TTTCAAAAAA ATAATTAAAA TCGACAGACA CGAATCATTT CGACCACAGA AGCTTCAACT ATTTTTATGT ATGCAAGAGT
    AAAGTTTTTT TATTAATTTT AGCTGTCTGT GCTTAGTAAA GCTGGTGTCT TCGAAGTTGA TAAAAATACA TACGTTCTCA

161 CAGCATATGT ATAATTGATT CAGAATCGTT TTGACGAGTT CGGATGTAGT AGTAGCCATT ATTTAATGTA CATACTAATC
    GTCGTATACA TATTAACTAA GTCTTAGCAA AACTGCTCAA GCCTACATCA TCATCGGTAA TAAATTACAT GTATGATTAG

241 GTGAATAGTG ATATGATGAA ACATTGTATC TTATTGTATA AATATCCATA AACACATCAT GAAAGACACT TTCTTTCACG
    CACTTATCAC TATACTACTT TGTAACATAG AATAACATAT TTATAGGTAT TTGTGTAGTA CTTTCTGTGA AAGAAAGTGC

321 GTCTGAATTA ATTATGATAC AATTCTAATA GAAAACGAAT TAAATTACGT TGAATTGTAT GAAATCTAAT TGAACAAGCC
    CAGACTTAAT TAATACTATG TTAAGATTAT CTTTTGCTTA ATTTAATGCA ACTTAACATA CTTTAGATTA ACTTGTTCGG

401 AACCACGACG ACGACTAACG TTGCCTGGAT TGACTCGGTT TAAGTTAACC ACTAAAAAAA CGGAGCTGTC ATGTAACACG
    TTGGTGCTGC TGCTGATTGC AACGGACCTA ACTGAGCCAA ATTCAATTGG TGATTTTTTT GCCTCGACAG TACATTGTGC

481 CGGATCGAGC AGGTCACAGT CATGAAGCCA TCAAAGCAAA AGAACTAATC CAAGGGCTGA GATGATTAAT TAGTTTAAAA
    GCCTAGCTCG TCCAGTGTCA GTACTTCGGT AGTTTCGTTT TCTTGATTAG GTTCCCGACT CTACTAATTA ATCAAATTTT
```

PstI

FIG. 10A

PATENT & TRADEMARK OFFICE AUG. 2 2 2002 OIPE JC18

```
561  ATTAGTTAAC ACGAGGGAAA AGGCTGTCTG ACAGCCAGGT CACGTTATCT TTACCTGCAG CAACTATTTT TATGTATGCA
     TAATCAATTG TGCTCCCTTT TCCGACAGAC TGTCGGTCCA GTGCAATAGA AATGGACGTC GTTGATAAAA ATACATACGT
-------------------------------------------------------------------------------------------

641  AGAGTCAGCA TATGTATAAT TGATTCAGAA TCGTTTTGAC GAGTTCGGAT GTAGTAGTAG CCATTATTTA ATGTACATAC
     TCTCAGTCGT ATACATATTA ACTAAGTCTT AGCAAAACTG CTCAAGCCTA CATCATCATC GGTAATAAAT TACATGTATG
-------------------------------------------------------------------------------------------

721  TAATCGTGAA TAGTGATATG ATGAAACATT GTATCTTATT GTATAAATAT CCATAAACAC ATCATGAAAG ACACTTTCTT
     ATTAGCACTT ATCACTATAC TACTTTGTAA CATAGAATAA CATATTTATA GGTATTTGTG TAGTACTTTC TGTGAAAGAA
-------------------------------------------------------------------------------------------

801  TCACGGTCTG AATTAATTAT GATACAATTC TAATAGAAAA CGAATTAAAT TACGTTGAAT TGTATGAAAT CTAATTGAAC
     AGTGCCAGAC TTAATTAATA CTATGTTAAG ATTATCTTTT GCTTAATTTA ATGCAACTTA ACATACTTTA GATTAACTTG
-------------------------------------------------------------------------------------------

881  AAGCCAACCA CGACGACGAC TAACGTTGCC TGGATTGACT CGGTTTAAGT TAACCACTAA AAAAACGGAG CTGTCATGTA
     TTCGGTTGGT GCTGCTGCTG ATTGCAACGG ACCTAACTGA GCCAAATTCA ATTGGTGATT TTTTTGCCTC GACAGTACAT
-------------------------------------------------------------------------------------------

961  ACACGCGGAT CGAGCAGGTC ACAGTCATGA AGCCATCAAA GCAAAAGAAC TAATCCAAGG GCTGAGATGA TTAATTAGTT
     TGTGCGCCTA GCTCGTCCAG TGTCAGTACT TCGGTAGTTT CGTTTTCTTG ATTAGGTTCC CGACTCTACT AATTAATCAA
-------------------------------------------------------------------------------------------

1041 TAAAAATTAG TTAACACGAG GGAAAAGGCT GTCTGACAGC CAGGTCACGT TATCTTTACC TGTGGTCGAA ATGATTCGTG
     ATTTTTAATC AATTGTGCTC CCTTTTCCGA CAGACTGTCG GTCCAGTGCA ATAGAAATGG ACACCAGCTT TACTAAGCAC
-------------------------------------------------------------------------------------------

1121 TCTGTCGATT TTAATTATTT TTTTGAAAGG CCGAAAATAA AGTTGTAAGA GATAAACCCG CCTATATAAA TTCATATATT
     AGACAGCTAA AATTAATAAA AAAACTTTCC GGCTTTTATT TCAACATTCT CTATTTGGGC GGATATATTT AAGTATATAA
-------------------------------------------------------------------------------------------

                BamHI
                ------
```


FIG. 10B

PATENT & TRADEMARK OFFICE AUG 2 2 2002 OIPE JC181

```
1201  TTCCTCTCCG CTTTGAAAAC AAGGATCC      Seq. ID No. 9
      AAGGAGAGGC GAAACTTTTG TTCCTAGG      Seq. ID No. 10
```

FIG. 10C

```
        BamHI
        ~~~~~~
   1  GGATCCTTTT GGGTTTTGGT GAGAAACAAG GAATAGTATG GATGGGTTTT AATAGGGAAT AAGAGTTGAA AAGTCTGCAA
      CCTAGGAAAA CCCAAAACCA CTCTTTGTTC CTTATCATAC CTACCCAAAA TTATCCCTTA TTCTCAACTT TTCAGACGTT

                                          HindIII
                                          ~~~~~~~
  81  TTTGTAAAAG AAAAAAATTG GAAAGTCACA TGTTAGCAGA AGCTTCAGAC TCATTAACTT AAAAGAAGAT ATAGACTCAT
      AAACATTTTC TTTTTTTAAC CTTTCAGTGT ACAATCGTCT TCGAAGTCTG AGTAATTGAA TTTTCTTCTA TATCTGAGTA

 161  TAACTTAAAA GAAGATATAG ATTCCAACAC AAGTTCAAAA TTCATAAACG TCAATCTTGG CTAAATTTCT GAACATCAAT
      ATTGAATTTT CTTCTATATC TAAGGTTGTG TTCAAGTTTT AAGTATTTGC AGTTAGAACC GATTTAAAGA CTTGTAGTTA

 241  GCATTCCTTT AAAATATAGA TAATAAGTTA GGATGTTGTC ACTTTCTTAA AGCATATTCC GACTGAGTCT GGTAGAATCT
      CGTAAGGAAA TTTTATATCT ATTATTCAAT CCTACAACAG TGAAAGAATT TCGTATAAGG CTGACTCAGA CCATCTTAGA

 321  CATAAACTTT AGGCCTTATC TCTTCAATTA GGCAATTACT TACCTCCGCT CTACTTTAAG AAAATTCAAT GGAGTACACC
      GTATTTGAAA TCCGGAATAG AGAAGTTAAT CCGTTAATGA ATGGAGGCGA GATGAAATTC TTTTAAGTTA CCTCATGTGG
```

FIG. 12A

PATENT & TRADEMARK OFFICE AUG 27 2002 OIPE JC181

```
401  ATTATTAAGT TCATATAAAA ATAAAATTAT ATTAATTCTG TCTCTTGTTG GTTCGCTCTA TCTTTTTCTG TTTTCCTGCT
     TAATAATTCA AGTATATTTT TATTTTAATA TAATTAAGAC AGAGAACAAC CAAGCGAGAT AGAAAAAGAC AAAAGGACGA
-------------------------------------------------------------------------------------------

481  TCAACCATAA CATATACAAG AACTACATTT TCCAAGCTAG ATATATCTAA CATGACTGAC TTTGTAAATT TCTTTTGCCA
     AGTTGGTATT GTATATGTTC TTGATGTAAA AGGTTCGATC TATATAGATT GTACTGACTG AAACATTTAA AGAAAACGGT
-------------------------------------------------------------------------------------------

561  AGTTAAAGAA AAAAAATGAT GTTATCCAAA TAATAAAGAG AAAGAGCCCT AATGAAAAAA ATGATTTACT ATTAGAGTTG
     TCAATTTCTT TTTTTTACTA CAATAGGTTT ATTATTTCTC TTTCTCGGGA TTACTTTTTT TACTAAATGA TAATCTCAAC
-------------------------------------------------------------------------------------------

641  TTCAGCTAAT CACATCAATT ATGGTTTTCA TCAAGTATGA CTAATGGCGG CTCTTATCTC AGCTGATGTG ACATTGAAAT
     AAGTCGATTA GTGTAGTTAA TACCAAAAGT AGTTCATACT GATTACCGCC GAGAATAGAG TGCACTACAC TGTAACTTTA
-------------------------------------------------------------------------------------------

                                                        PstI
                                                        ~~~~~~
721  TCTTTGACTT TAACACTAAT GTCATATGCT TTCAAATTAA TAATCCGATA AAGCTGCAGA CTCATTAACT TAAAAGAAGA
     AGAAACTGAA ATTGTGATTA CAGTATACGA AAGTTTAATT ATTAGGCTAT TTCGACGTCT GAGTAATTGA ATTTTCTTCT
-------------------------------------------------------------------------------------------

801  TATAGACTCA TTAACTTAAA AGAAGATATA GATTCCAACA CAAGTTCAAA ATTCATAAAC GTCAATCTTG GCTAAATTTC
     ATATCTGAGT AATTGAATTT TCTTCTATAT CTAAGGTTGT GTTCAAGTTT TAAGTATTTG CAGTTAGAAC CGATTTAAAG
-------------------------------------------------------------------------------------------

881  TGAACATCAA TGCATTCCTT TAAAATATAG ATAATAAGTT AGGATGTTGT CACTTTCTTA AAGCATATTC CGACTGAGTC
     ACTTGTAGTT ACGTAAGGAA ATTTTATATC TATTATTCAA TCCTACAACA GTGAAAGAAT TTCGTATAAG GCTGACTCAG
-------------------------------------------------------------------------------------------

961  TGGTAGAATC TCATAAACTT TAGGCCTTAT CTCTTCAATT AGGCAATTAC TTACCTCCGC TCTACTTTAA GAAAATTCAA
     ACCATCTTAG AGTATTTGAA ATCCGGAATA GAGAAGTTAA TCCGTTAATG AATGGAGGCG AGATGAAATT CTTTTAAGTT
-------------------------------------------------------------------------------------------
```


FIG. 12B

```
1041  TGGAGTACAC CATTATTAAG TTCATATAAA AATAAAATTA TATTAATTCT GTCTCTTGTT GGTTCGCTCT ATCTTTTTCT
      ACCTCATGTG GTAATAATTC AAGTATATTT TTATTTTAAT ATAATTAAGA CAGAGAACAA CCAAGCGAGA TAGAAAAAGA
-------------------------------------------------------------------------------------------

1121  GTTTTCCTGC TTCAACCATA ACATATACAA GAACTACATT TTCCAAGCTA GATATATCTA ACATGACTGA CTTTGTAAAT
      CAAAAGGACG AAGTTGGTAT TGTATATGTT CTTGATGTAA AAGGTTCGAT CTATATAGAT TGTACTGACT GAAACATTTA
-------------------------------------------------------------------------------------------

1201  TTCTTTTGCC AAGTTAAAGA AAAAAAATGA TGTTATCCAA ATAATAAAGA GAAAGAGCCC TAATGAAAAA AATGATTTAC
      AAGAAAACGG TTCAATTTCT TTTTTTTACT ACAATAGGTT TATTATTTCT CTTTCTCGGG ATTACTTTTT TTACTAAATG
-------------------------------------------------------------------------------------------

1281  TATTAGAGTT GTTCAGCTAA TCACATCAAT TATGGTTTTC ATCAAGTATG ACTAATGGCG GCTCTTATCT CACGTGATGT
      ATAATCTCAA CAAGTCGATT AGTGTAGTTA ATACCAAAAG TAGTTCATAC TGATTACCGC CGAGAATAGA GTGCACTACA
-------------------------------------------------------------------------------------------

1361  GACATTGAAA TTCTTTGACT TTAACACTAA TGTCATATGC TTTCAAATTA ATAATCCGAT AAAGTCTGCT AACATGTGAC
      CTGTAACTTT AAGAAACTGA AATTGTGATT ACAGTATACG AAAGTTTAAT TATTAGGCTA TTTCAGACGA TTGTACACTG
-------------------------------------------------------------------------------------------

1441  TTTCCAATTT TTTTCTTTTA CAAATTGCAG ACTTTTCAAC TCTTATTCCC TATTAAAACC CATCCATACT ATTCCTTGTT
      AAAGGTTAAA AAAAGAAAAT GTTTAACGTC TGAAAAGTTG AGAATAAGGG ATAATTTTGG GTAGGTATGA TAAGGAACAA
-------------------------------------------------------------------------------------------

                          BamHI
                          ~~~~~~

1521  TCTCACCAAA ACCCAAAAGG ATCC      Seq. ID No. 11
      AGAGTGGTTT TGGGTTTTCC TAGG      Seq. ID No. 12
-------------------------------------------------------------------------------------------
```


FIG. 12C

OIPE
AUG 2 2 2002
PATENT & TRADEMARK OFFICE
JC#81

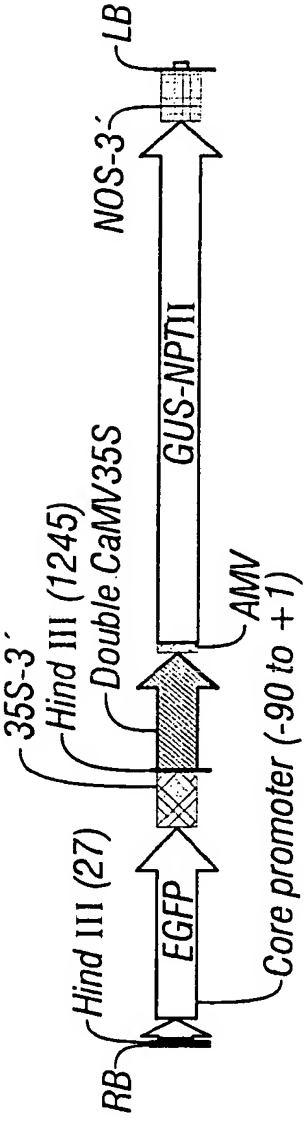


FIG. 13A

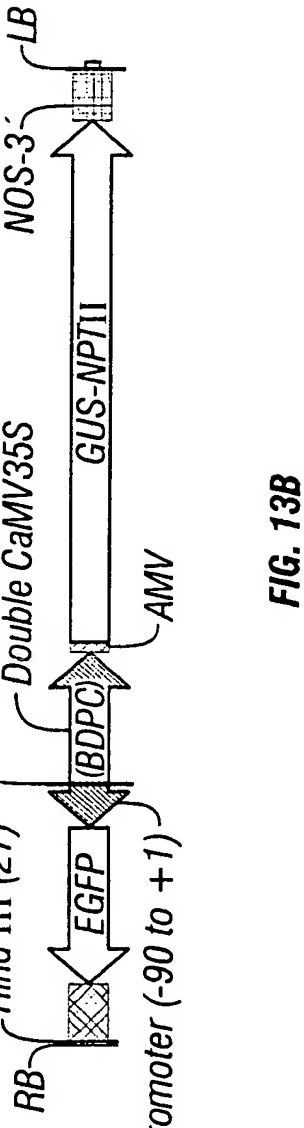


FIG. 13B

OIPE
AUG 2 2 2002
PATENT & TRADEMARK OFFICE
JC161

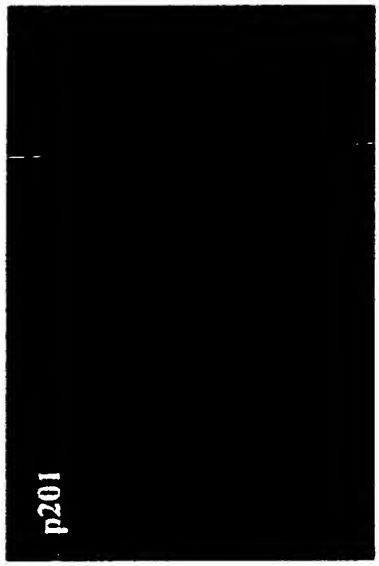


FIG. 14B

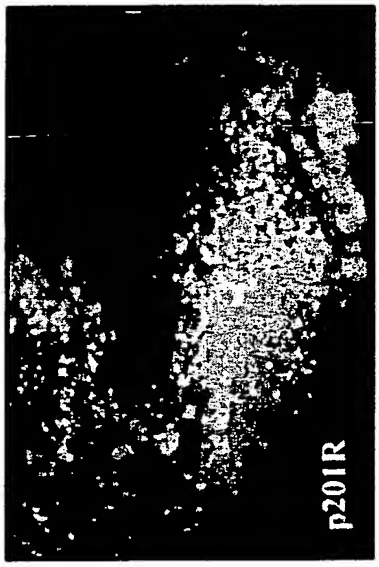


FIG. 14D

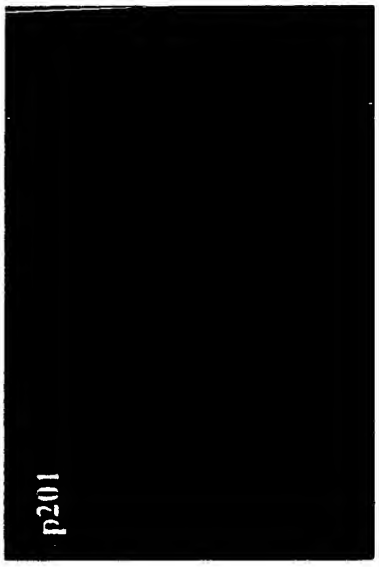


FIG. 14A

FIG. 14C

OIPE
AUG 2 2 2002
PATENT & TRADEMARK OFFICE
JC161

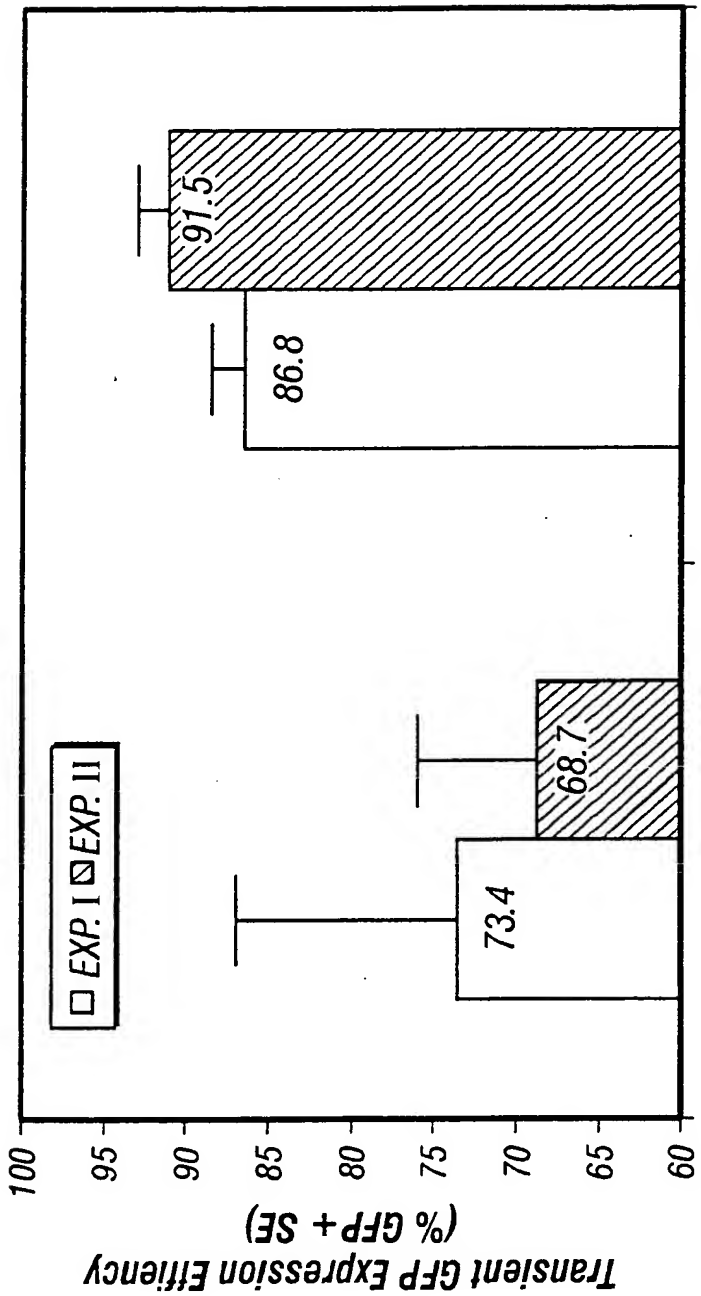


FIG. 15

OIPE JC101
AUG 22 2002
PATENT & TRADEMARK OFFICE

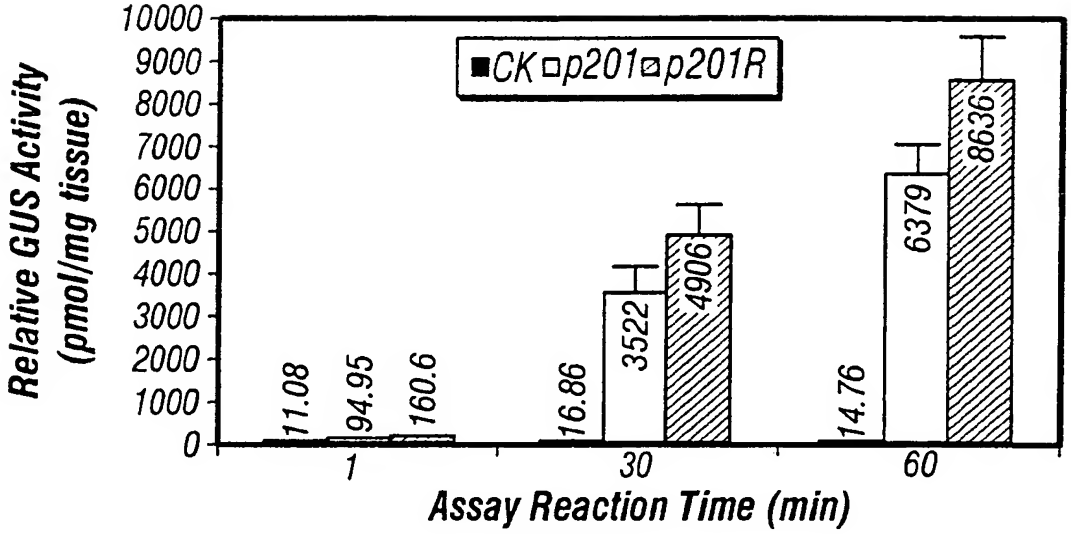


FIG. 16A

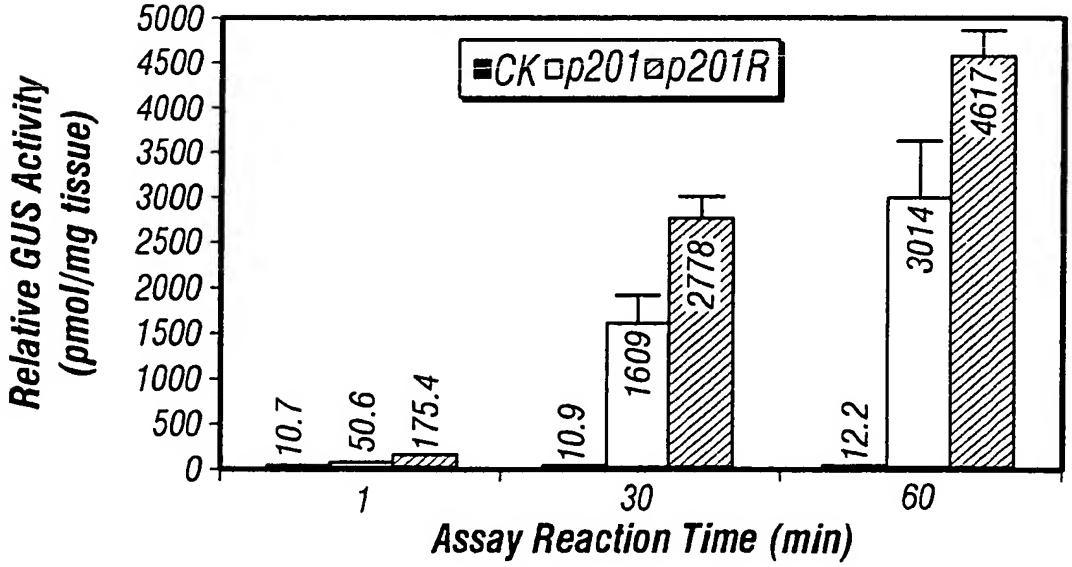


FIG. 16B

OIPE JC181
AUG 22 2002
PATENT & TRADEMARK OFFICE

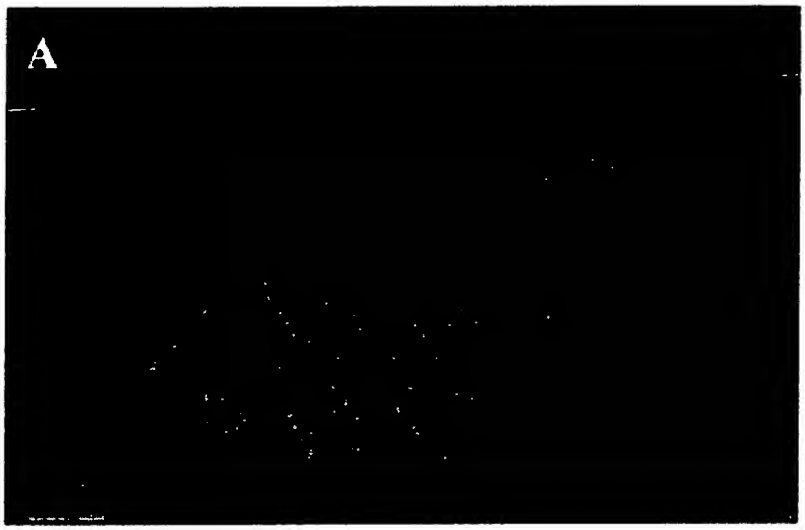


FIG. 17A

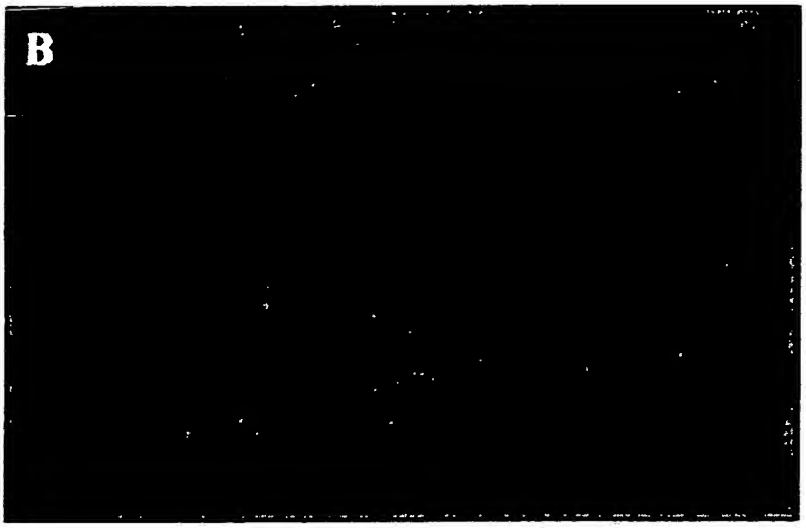


FIG. 17B

PATENT & TRADEMARK OFFICE AUG 22 2002 OIPE JC103

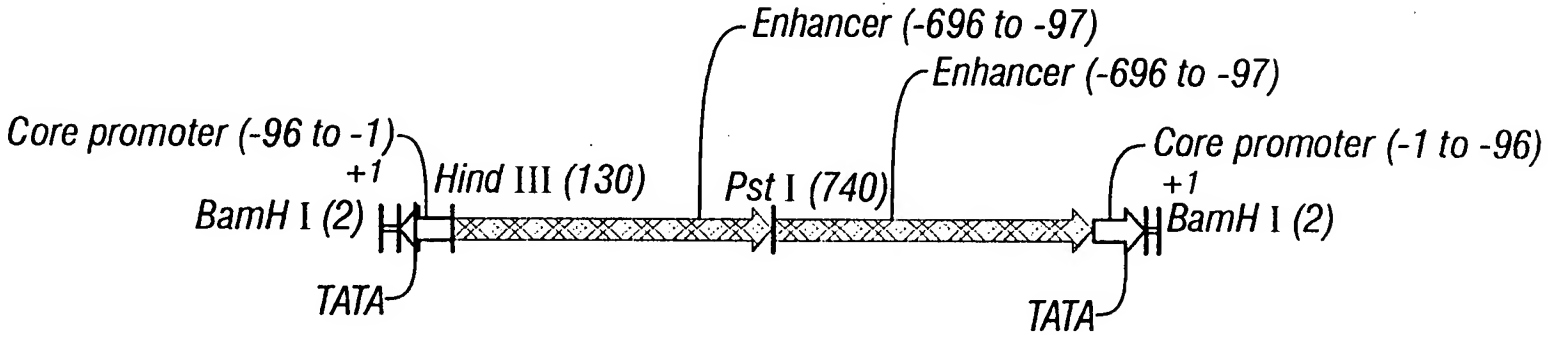


FIG. 18

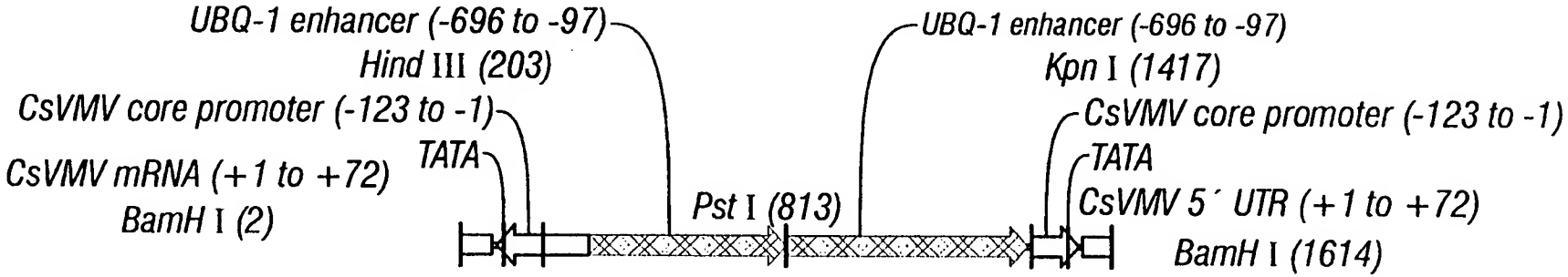


FIG. 20

AUG 2 2 2002 TRADEMARK OFFICE PTO

BamHI

```
 1  GGATCCCTTT TGTGTTTCGT CTTCTCTCAC GTAGAAACCC TAAACAAGGA GGAGGCGGGT TTATATATGT CAATGTACGC
    CCTAGGGAAA ACACAAAGCA GAAGAGAGTG CATCTTTGGG ATTTGTTCCT CCTCCGCCCA AATATATACA GTTACATGCG
```

HindIII

```
81  GTCTAGGGTT TTGCTAATAT TGGGCTAGGT TACAGGCCTT TACCACAAAA GCTTAGTTGA TAAAATATTT TTATTTGGTT
    CAGATCCCAA AACGATTATA ACCCGATCCA ATGTCCGGAA ATGGTGTTTT CGAATCAACT ATTTTATAAA AATAAACCAA

161 GTAATTTTGT AATATCCCGG GATATTTCAC AAATTGAACA TAGACTACAG AATTTTAGAA AACAAACTTT CTCTCTCTTA
    CATTAAAACA TTATAGGGCC CTATAAAGTG TTTAACTTGT ATCTGATGTC TTAAAATCTT TTGTTTGAAA GAGAGAGAAT

241 TCTCACCTTT ATCTTTTAGA GAGAAAAAGT TCGATTTCCG GTTGACCGGA ATGTATCTTT GTTTTTTTTG TTTTGTAACA
    AGAGTGGAAA TAGAAAATCT CTCTTTTTCA AGCTAAAGGC CAACTGGCCT TACATAGAAA CAAAAAAAAC AAAACATTGT

321 TATTTCGTTT TCCGATTTAG ATCGGATCTC CTTTTCCGTT TTGTCGGACC TTCTTCCGGT TTATCCGGAT CTAATAATAT
    ATAAAGCAAA AGGCTAAATC TAGCCTAGAG GAAAAGGCAA AACAGCCTGG AAGAAGGCCA AATAGGCCTA GATTATTATA

401 CCATCTTAGA CTTAGCTAAG TTTGGATCTG TTTTTTGGTT AGCTCTTGTC AATCGCCTCA TCATCAGCAA GAAGGTGAAA
    GGTAGAATCT GAATCGATTC AAACCTAGAC AAAAAACCAA TCGAGAACAG TTAGCGGAGT AGTAGTCGTT CTTCCACTTT

481 TTTTTGACAA ATAAATCTTA GAATCATGTA GTGTCTTTGG ACCTTGGGAA TGATAGAAAC GATTTGTTAT AGCTACTCTA
    AAAAACTGTT TATTTAGAAT CTTAGTACAT CACAGAAACC TGGAACCCTT ACTATCTTTG CTAAACAATA TCGATGAGAT
```


FIG. 19A

PATENT & TRADEMARK OFFICE AUG 22 2002 OIPE

```
561  TGTATCAGAC CCTGACCAAG ATCCAACAAT CTCATAGGTT TTGTGCATAT GAAACCTTCG ACTAACGAGA AGTGGTCTTT
     ACATAGTCTG GGACTGGTTC TAGGTTGTTA GAGTATCCAA AACACGTATA CTTTGGAAGC TGATTGCTCT TCACCAGAAA
-----------------------------------------------------------------------------------------

641  TAATGAGAGA GATATCTAAA ATGTTATCTT AAAAGCCCAC TCAAATCTCA AGGCATAAGG TAGAAATGCA AATTTGGAAA
     ATTACTCTCT CTATAGATTT TACAATAGAA TTTTCGGGTG AGTTTAGAGT TCCGTATTCC ATCTTTACGT TTAAACCTTT
-----------------------------------------------------------------------------------------

                    PstI
                    ~~~~~~
721  GTGGGCTGGG CCTTCTGCAG TTGATAAAAT ATTTTTATTT GGTTGTAATT TTGTAATATC CCGGGATATT TCACAAATTG
     CACCCGACCC GGAAGACGTC AACTATTTTA TAAAAATAAA CCAACATTAA AACATTATAG GGCCCTATAA AGTGTTTAAC
-----------------------------------------------------------------------------------------

801  AACATAGACT ACAGAATTTT AGAAAACAAA CTTTCTCTCT CTTATCTCAC CTTTATCTTT TAGAGAGAAA AAGTTCGATT
     TTGTATCTGA TGTCTTAAAA TCTTTTGTTT GAAAGAGAGA GAATAGAGTG GAAATAGAAA ATCTCTCTTT TTCAAGCTAA
-----------------------------------------------------------------------------------------

881  TCCGGTTGAC CGGAATGTAT CTTTGTTTTT TTTGTTTTGT AACATATTTC GTTTTCCGAT TTAGATCGGA TCTCCTTTTC
     AGGCCAACTG GCCTTACATA GAAACAAAAA AAACAAAACA TTGTATAAAG CAAAAGGCTA AATCTAGCCT AGAGGAAAAG
-----------------------------------------------------------------------------------------

961  CGTTTTGTCG GACCTTCTTC CGGTTTATCC GGATCTAATA ATATCCATCT TAGACTTAGC TAAGTTTGGA TCTGTTTTTT
     GCAAAACAGC CTGGAAGAAG GCCAAATAGG CCTAGATTAT TATAGGTAGA ATCTGAATCG ATTCAAACCT AGACAAAAAA
-----------------------------------------------------------------------------------------

1041 GGTTAGCTCT TGTCAATCGC CTCATCATCA GCAAGAAGGT GAAATTTTTG ACAAATAAAT CTTAGAATCA TGTAGTGTCT
     CCAATCGAGA ACAGTTAGCG GAGTAGTAGT CGTTCTTCCA CTTTAAAAAC TGTTTATTTA GAATCTTAGT ACATCACAGA
-----------------------------------------------------------------------------------------

1121 TTGGACCTTG GGAATGATAG AAACGATTTG TTATAGCTAC TCTATGTATC AGACCCTGAC CAAGATCCAA CAATCTCATA
     AACCTGGAAC CCTTACTATC TTTGCTAAAC AATATCGATG AGATACATAG TCTGGGACTG GTTCTAGGTT GTTAGAGTAT
-----------------------------------------------------------------------------------------
```

FIG. 19B

PATENT & TRADEMARK OFFICE AUG. 2 2 2000 O I P E JC181

```
1201  GGTTTTGTGC ATATGAAACC TTCGACTAAC GAGAAGTGGT CTTTTAATGA GAGAGATATC TAAAATGTTA TCTTAAAAGC
      CCAAAACACG TATACTTTGG AAGCTGATTG CTCTTCACCA GAAAATTACT CTCTCTATAG ATTTTACAAT AGAATTTTCG
-------------------------------------------------------------------------------------------

1281  CCACTCAAAT CTCAAGGCAT AAGGTAGAAA TGCAAATTTG GAAAGTGGGC TGGGCCTTTT GTGGTAAAGG CCTGTAACCT
      GGTGAGTTTA GAGTTCCGTA TTCCATCTTT ACGTTTAAAC CTTTCACCCG ACCCGGAAAA CACCATTTCC GGACATTGGA
-------------------------------------------------------------------------------------------

1361  AGCCCAATAT TAGCAAAACC CTAGACGCGT ACATTGACAT ATATAAACCC GCCTCCTCCT TGTTTAGGGT TTCTACGTGA
      TCGGGTTATA ATCGTTTTGG GATCTGCGCA TGTAACTGTA TATATTTGGG CGGAGGAGGA ACAAATCCCA AAGATGCACT
-------------------------------------------------------------------------------------------

                          BamHI
                          ~~~~~~
1441  GAGAAGACGA AACACAAAAG GATCC     Seq. ID No. 13
      CTCTTCTGCT TTGTGTTTTC CTAGG     Seq. ID No. 14
-------------------------------------------------------------------------------------------
```


FIG. 19C

```
      BamHI
      ~~~~~~
  1   GGATCCACAA ACTTACAAAT TTCTCTGAAG TTGTATCCTC AGTACTTCAA AGAAAATAGC TTACACCAAA TTTTTTCTTG
      CCTAGGTGTT TGAATGTTTA AAGAGACTTC AACATAGGAG TCATGAAGTT TCTTTTATCG AATGTGGTTT AAAAAAGAAC
-------------------------------------------------------------------------------------------

 81   TTTTCACAAA TGCCGAACTT GGTTCCTTAT ATAGGAAAAC TCAAGGGCAA AAATGACACG GAAAAATATA AAAGGATAAG
      AAAAGTGTTT ACGGCTTGAA CCAAGGAATA TATCCTTTTG AGTTCCCGTT TTTACTGTGC CTTTTTATAT TTTCCTATTC
-------------------------------------------------------------------------------------------
```

FIG. 21A

PATENT & TRADEMARK OFFICE AUG 22 2002 OIPE JC1#3

HindIII

```
161  TAGTGGGGGA TAAGATTCCT TTGTGATAAG GTTACTTTCC GAAGCTTAGT TGATAAAATA TTTTTATTTG GTTGTAATTT
     ATCACCCCCT ATTCTAAGGA AACACTATTC CAATGAAAGG CTTCGAATCA ACTATTTTAT AAAAATAAAC CAACATTAAA
---------------------------------------------------------------------------------------------
241  TGTAATATCC CGGGATATTT CACAAATTGA ACATAGACTA CAGAATTTTA GAAAACAAAC TTTCTCTCTC TTATCTCACC
     ACATTATAGG GCCCTATAAA GTGTTTAACT TGTATCTGAT GTCTTAAAAG CTTTTGTTTG AAAGAGAGAG AATAGAGTGG
---------------------------------------------------------------------------------------------
321  TTTATCTTTT AGAGAGAAAA AGTTCGATTT CCGGTTGACC GGAATGTATC TTTGTTTTTT TTGTTTTGTA ACATATTTCG
     AAATAGAAAA TCTCTCTTTT TCAAGCTAAA GGCCAACTGG CCTTACATAG AAACAAAAAA AACAAAACAT TGTATAAAGC
---------------------------------------------------------------------------------------------
401  TTTTCCGATT TAGATCGGAT CTCCTTTTCC GTTTTGTCGG ACCTTCTTCC GGTTTATCCG GATCTAATAA TATCCATCTT
     AAAAGGCTAA ATCTAGCCTA GAGGAAAAGG CAAAACAGCC TGGAAGAAGG CCAAATAGGC CTAGATTATT ATAGGTAGAA
---------------------------------------------------------------------------------------------
481  AGACTTAGCT AAGTTTGGAT CTGTTTTTTG GTTAGCTCTT GTCAATCGCC TCATCATCAG CAAGAAGGTG AAATTTTTGA
     TCTGAATCGA TTCAAACCTA GACAAAAAAC CAATCGAGAA CAGTTAGCGG AGTAGTAGTC GTTCTTCCAC TTTAAAAACT
---------------------------------------------------------------------------------------------
561  CAAATAAATC TTAGAATCAT GTAGTGTCTT TGGACCTTGG GAATGATAGA AACGATTTGT TATAGCTACT CTATGTATCA
     GTTTATTTAG AATCTTAGTA CATCACAGAA ACCTGGAACC CTTACTATCT TTGCTAAACA ATATCGATGA GATACATAGT
---------------------------------------------------------------------------------------------
641  GACCCTGACC AAGATCCAAC AATCTCATAG GTTTTGTGCA TATGAAACCT TCGACTAACG AGAAGTGGTC TTTTAATGAG
     CTGGGACTGG TTCTAGGTTG TTAGAGTATC CAAAACACGT ATACTTTGGA AGCTGATTGC TCTTCACCAG AAAATTACTC
---------------------------------------------------------------------------------------------
721  AGAGATATCT AAAATGTTAT CTTAAAAGCC CACTCAAATC TCAAGGCATA AGGTAGAAAT GCAAATTTGG AAAGTGGGCT
     TCTCTATAGA TTTTACAATA GAATTTTCGG GTGAGTTTAG AGTTCCGTAT TCCATCTTTA CGTTTAAACC TTTCACCCGA
---------------------------------------------------------------------------------------------
```


FIG. 21B

PATENT & TRADEMARK OFFICE AUG. 2 2 2002 OIPE JC18

PstI

```
801  GGGCCTTCTG CAGTTGATAA AATATTTTTA TTTGGTTGTA ATTTTGTAAT ATCCCGGGAT ATTTCACAAA TTGAACATAG
     CCCGGAAGAC GTCAACTATT TTATAAAAAT AAACCAACAT TAAAACATTA TAGGGCCCTA TAAAGTGTTT AACTTGTATC
---------------------------------------------------------------------------------------------

881  ACTACAGAAT TTTAGAAAAC AAACTTTCTC TCTCTTATCT CACCTTTATC TTTTAGAGAG AAAAAGTTCG ATTTCCGGTT
     TGATGTCTTA AAATCTTTTG TTTGAAAGAG AGAGAATAGA GTGGAAATAG AAAATCTCTC TTTTTCAAGC TAAAGGCCAA
---------------------------------------------------------------------------------------------

961  GACCGGAATG TATCTTTGTT TTTTTTGTTT TGTAACATAT TTCGTTTTCC GATTTAGATC GGATCTCCTT TTCCGTTTTG
     CTGGCCTTAC ATAGAAACAA AAAAAACAAA ACATTGTATA AAGCAAAAGG CTAAATCTAG CCTAGAGGAA AAGGCAAAAC
---------------------------------------------------------------------------------------------

1041 TCGGACCTTC TTCCGGTTTA TCCGGATCTA ATAATATCCA TCTTAGACTT AGCTAAGTTT GGATCTGTTT TTTGGTTAGC
     AGCCTGGAAG AAGGCCAAAT AGGCCTAGAT TATTATAGGT AGAATCTGAA TCGATTCAAA CCTAGACAAA AAACCAATCG
---------------------------------------------------------------------------------------------

1121 TCTTGTCAAT CGCCTCATCA TCAGCAAGAA GGTGAAATTT TTGACAAATA AATCTTAGAA TCATGTAGTG TCTTTGGACC
     AGAACAGTTA GCGGAGTAGT AGTCGTTCTT CCACTTTAAA AACTGTTTAT TTAGAATCTT AGTACATCAC AGAAACCTGG
---------------------------------------------------------------------------------------------

1201 TTGGGAATGA TAGAAACGAT TTGTTATAGC TACTCTATGT ATCAGACCCT GACCAAGATC CAACAATCTC ATAGGTTTTG
     AACCCTTACT ATCTTTGCTA AACAATATCG ATGAGATACA TAGTCTGGGA CTGGTTCTAG GTTGTTAGAG TATCCAAAAC
---------------------------------------------------------------------------------------------

1281 TGCATATGAA ACCTTCGACT AACGAGAAGT GGTCTTTTAA TGAGAGAGAT ATCTAAAATG TTATCTTAAA AGCCCACTCA
     ACGTATACTT TGGAAGCTGA TTGCTCTTCA CCAGAAAATT ACTCTCTCTA TAGATTTTAC AATAGAATTT TCGGGTGAGT
---------------------------------------------------------------------------------------------
```

KpnI

FIG. 21C

OIPE JC18J AUG 2 7 2002 TRADEMARK OFFICE

```
1361  AATCTCAAGG CATAAGGTAG AAATGCAAAT TTGGAAAGTG GGCTGGGCCT TGGTACCCGG AAAGTAACCT TATCACAAAG
      TTAGAGTTCC GTATTCCATC TTTACGTTTA AACCTTTCAC CCGACCCGGA ACCATGGGCC TTTCATTGGA ATAGTGTTTC
-------------------------------------------------------------------------------------------

1441  GAATCTTATC CCCCACTACT TATCCTTTTA TATTTTTCCG TGTCATTTTT GCCCTTGAGT TTTCCTATAT AAGGAAGGAA
      CTTAGAATAG GGGGTGATGA ATAGGAAAAT ATAAAAAGGC ACAGTAAAAA CGGGAACTCA AAAGGATATA TTCCTTGGTT
-------------------------------------------------------------------------------------------

1521  GTTCGGCATT TGTGAAAACA AGAAAAAATT TGGTGTAAGC TATTTTCTTT GAAGTACTGA GGATACAACT TCAGAGAAAT
      CAAGCCGTAA ACACTTTTGT TCTTTTTTAA ACCACATTCG ATAAAAGAAA CTTCATGACT CCTATGTTGA AGTCTCTTTA
-------------------------------------------------------------------------------------------

                  BamHI
                  ------

1601  TTGTAAGTTT GTGGATCC     Seq. ID No. 15
      AACATTCAAA CACCTAGG     Seq. ID No. 16
-------------------------------------------------------------------------------------------
```


FIG. 21D

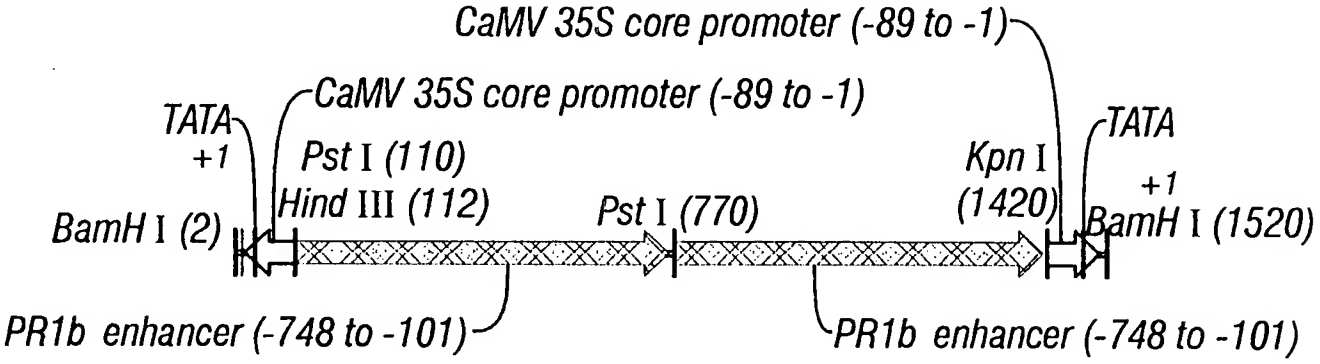


FIG. 22

PATENT & TRADEMARK OFFICE AUG 2 2 2001 JC481 OIPE

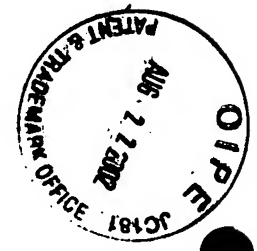
BamHI

```
 1  GGATCCAGCG TGTCCTCTCC AAATGAAATG AACTTCCTTA TATAGAGGAA GGGTCTTGCG AAGGATAGTG GGATTGTGCG
    CCTAGGTCGC ACAGGAGAGG TTTACTTTAC TTGAAGGAAT ATATCTCCTT CCCAGAACGC TTCCTATCAC CCTAACACGC
```

PstI HindIII

```
 81  TCATCCCTTA CGTCAGTGGA GATACTGCAG AAGCTTCAGA CTCATTAACT TAAAAGAAGA TATAGACTCA TTAACTTAAA
     AGTAGGGAAT GCAGTCACCT CTATGACGTC TTCGAAGTCT GAGTAATTGA ATTTTCTTCT ATATCTGAGT AATTGAATTT

161  AGAAGATATA GATTCCAACA CAAGTTCAAA ATTCATAAAC GTCAATCTTG GCTAAATTTC TGAACATCAA TGCATTCCTT
     TCTTCTATAT CTAAGGTTGT GTTCAAGTTT TAAGTATTTG CAGTTAGAAC CGATTTAAAG ACTTGTAGTT ACGTAAGGAA

241  TAAAATATAG ATAATAAGTT AGGATGTTGT CACTTTCTTA AAGCATATTC CGACTGAGTC TGGTAGAATC TCATAAACTT
     ATTTTATATC TATTATTCAA TCCTACAACA GTGAAAGAAT TTCGTATAAG GCTGACTCAG ACCATCTTAG AGTATTTGAA

321  TAGGCCTTAT CTCTTCAATT AGGCAATTAC TTACCTCCGC TCTACTTTAA GAAAATTCAA TGGAGTACAC CATTATTAAG
     ATCCGGAATA GAGAAGTTAA TCCGTTAATG AATGGAGGCG AGATGAAATT CTTTTAAGTT ACCTCATGTG GTAATAATTC

401  TTCATATAAA AATAAAATTA TATTAATTCT GTCTCTTGTT GGTTCGCTCT ATCTTTTTCT GTTTTCCTGC TTCAACCATA
     AAGTATATTT TTATTTTAAT ATAATTAAGA CAGAGAACAA CCAAGCGAGA TAGAAAAAGA CAAAAGGACG AAGTTGGTAT

481  ACATATACAA GAACTACATT TTCCAAGCTA GATATATCTA ACATGACTGA CTTTGTAAAT TTCTTTTGCC AAGTTAAAGA
     TGTATATGTT CTTGATGTAA AAGGTTCGAT CTATATAGAT TGTACTGACT GAAACATTTA AAGAAAAGCC TTCAATTTCT
```


FIG. 23A




```
561  AAAAAAATGA TGTTATCCAA ATAATAAAGA GAAAGAGCCC TAATGAAAAA AATGATTTAC TATTAGAGTT GTTCAGCTAA
     TTTTTTTACT ACAATAGGTT TATTATTTCT CTTTCTCGGG ATTACTTTTT TTACTAAATG ATAATCTCAA CAAGTCGATT
-----------------------------------------------------------------------------------------

641  TCACATCAAT TATGGTTTTC ATCAAGTATG ACTAATGGCG GCTCTTATCT CACGTGATGT GACATTGAAA TTCTTTGACT
     AGTGTAGTTA ATACCAAAAG TAGTTCATAC TGATTACCGC CGAGAATAGA GTGCACTACA CTGTAACTTT AAGAAACTGA
-----------------------------------------------------------------------------------------

                                        PstI
                                        ~~~~~~

721  TTAACACTAA TGTCATATGC TTTCAAATTA ATAATCCGAT AAAGCTGCAG ACTCATTAAC TTAAAAGAAG ATATAGACTC
     AATTGTGATT ACAGTATACG AAAGTTTAAT TATTAGGCTA TTTCGACGTC TGAGTAATTG AATTTTCTTC TATATCTGAG
-----------------------------------------------------------------------------------------

801  ATTAACTTAA AAGAAGATAT AGATTCCAAC ACAAGTTCAA AATTCATAAA CGTCAATCTT GGCTAAATTT CTGAACATCA
     TAATTGAATT TTCTTCTATA TCTAAGGTTG TGTTCAAGTT TTAAGTATTT GCAGTTAGAA CCGATTTAAA GACTTGTAGT
-----------------------------------------------------------------------------------------

881  ATGCATTCCT TTAAAATATA GATAATAAGT TAGGATGTTG TCACTTTCTT AAAGCATATT CCGACTGAGT CTGGTAGAAT
     TACGTAAGGA AATTTTATAT CTATTATTCA ATCCTACAAC AGTGAAAGAA TTTCGTATAA GGCTGACTCA GACCATCTTA
-----------------------------------------------------------------------------------------

961  CTCATAAACT TTAGGCCTTA TCTCTTCAAT TAGGCAATTA CTTACCTCCG CTCTACTTTA AGAAAATTCA ATGGAGTACA
     GAGTATTTGA AATCCGGAAT AGAGAAGTTA ATCCGTTAAT GAATGGAGGC GAGATGAAAT TCTTTTAAGT TACCTCATGT
-----------------------------------------------------------------------------------------

1041 CCATTATTAA GTTCATATAA AAATAAAATT ATATTAATTC TGTCTCTTGT TGGTTCGCTC TATCTTTTTC TGTTTTCCTG
     GGTAATAATT CAAGTATATT TTTATTTTAA TATAATTAAG ACAGAGAACA ACCAAGCGAG ATAGAAAAAG ACAAAAGGAC
-----------------------------------------------------------------------------------------
```


FIG. 23B

```
1121  CTTCAACCAT AACATATACA AGAACTACAT TTTCCAAGCT AGATATATCT AACATGACTG ACTTTGTAAA TTTCTTTTGC
      GAAGTTGGTA TTGTATATGT TCTTGATGTA AAAGGTTCGA TCTATATAGA TTGTACTGAC TGAAACATTT AAAGAAAACG
-------------------------------------------------------------------------------------------

1201  CAAGTTAAAG AAAAAAAATG ATGTTATCCA AATAATAAAG AGAAAGAGCC CTAATGAAAA AAATGATTTA CTATTAGAGT
      GTTCAATTTC TTTTTTTTAC TACAATAGGT TTATTATTTC TCTTTCTCGG GATTACTTTT TTTACTAAAT GATAATCTCA
-------------------------------------------------------------------------------------------

1281  TGTTCAGCTA ATCACATCAA TTATGGTTTT CATCAAGTAT GACTAATGGC GGCTCTTATC TCACGTGATG TGACATTGAA
      ACAAGTCGAT TAGTGTAGTT AATACCAAAA GTAGTTCATA CTGATTACCG CCGAGAATAG AGTGCACTAC ACTGTAACTT
-------------------------------------------------------------------------------------------

                                                        KpnI
                                                        ~~~~~~

1361  ATTCTTTGAC TTTAACACTA ATGTCATATG CTTTCAAATT AATAATCCGA TAAAGGTACC TATCTCCACT GACGTAAGGG
      TAAGAAACTG AAATTGTGAT TACAGTATAC GAAAGTTTAA TTATTAGGCT ATTTCCATGG ATAGAGGTGA CTGCATTCCC
-------------------------------------------------------------------------------------------

                                                                                BamHI
                                                                                ~~

1441  ATGACGCACA ATCCCACTAT CCTTCGCAAG ACCCTTCCTC TATATAAGGA AGTTCATTTC ATTTGGAGAG GACACGCTGG
      TACTGCGTGT TAGGGTGATA GGAAGCGTTC TGGGAAGGAG ATATATTCCT TCAAGTAAAG TAAACCTCTC CTGTGCGACC
-------------------------------------------------------------------------------------------

      BamH
      ~~~~

1521  ATCC    Seq. ID No. 17
      TAGG    Seq. ID No. 18
-------------------------------------------------------------------------------------------
```

FIG. 23C

PATENT & TRADEMARK OFFICE
APR. 2 2002
JC161

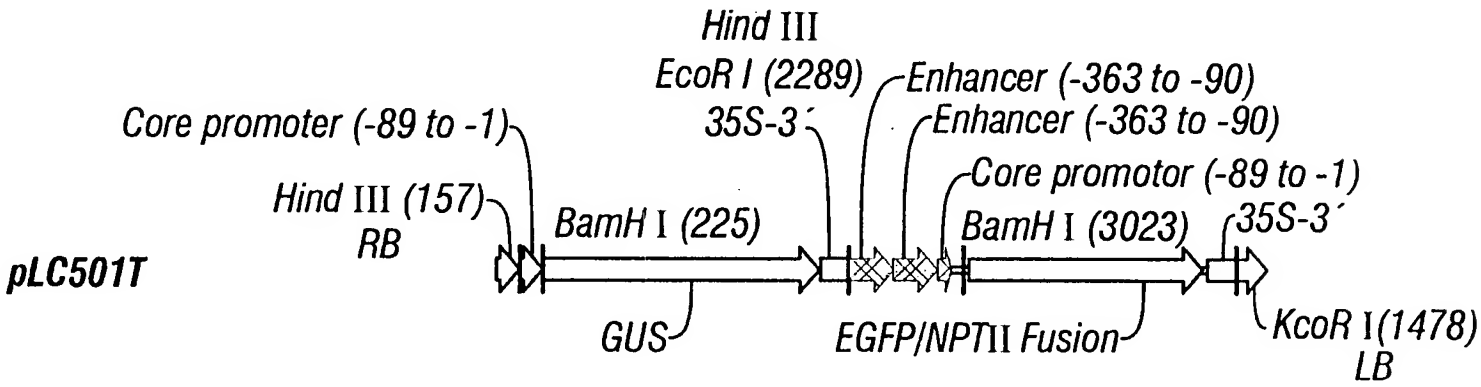


FIG. 24A

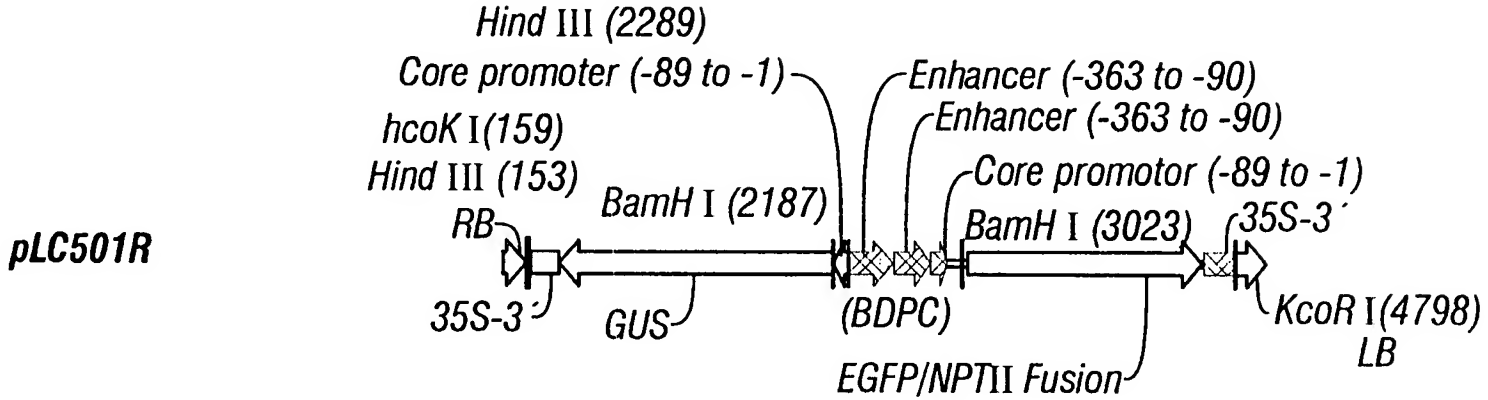


FIG. 24B

OIPE JC181
AUG 22 2002
PATENT & TRADEMARK OFFICE

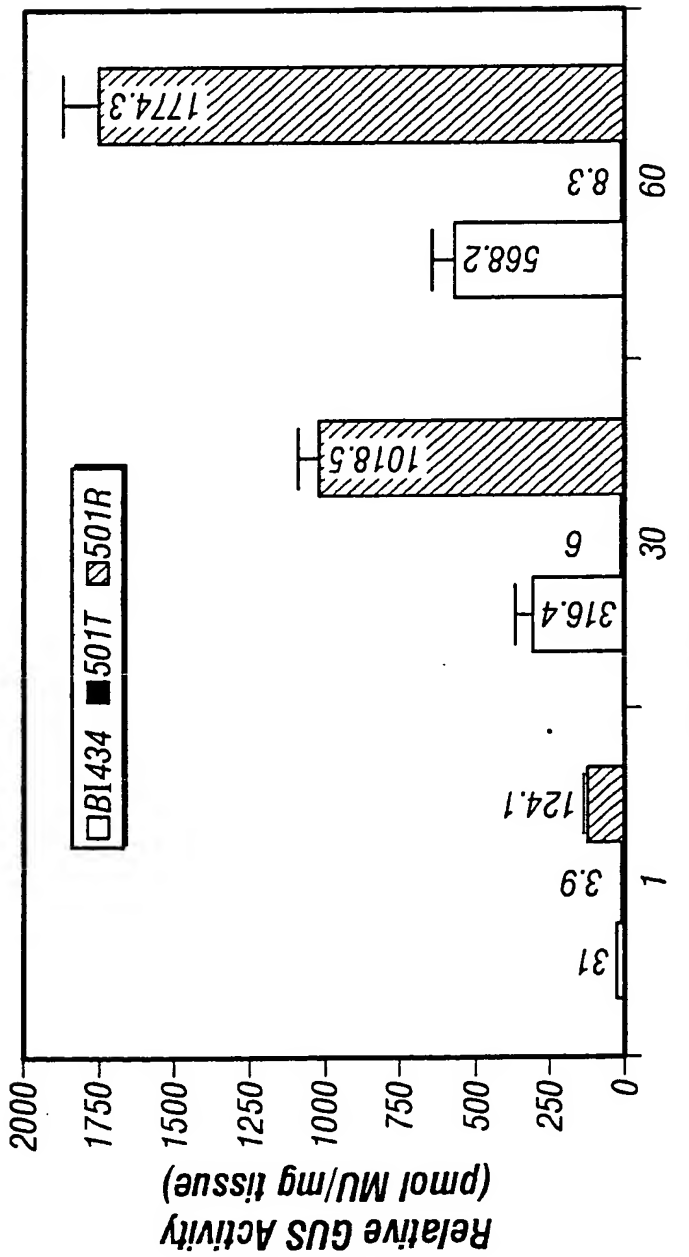


FIG. 25

PATENT & TRADEMARK OFFICE AUG 22 2002 OIPE

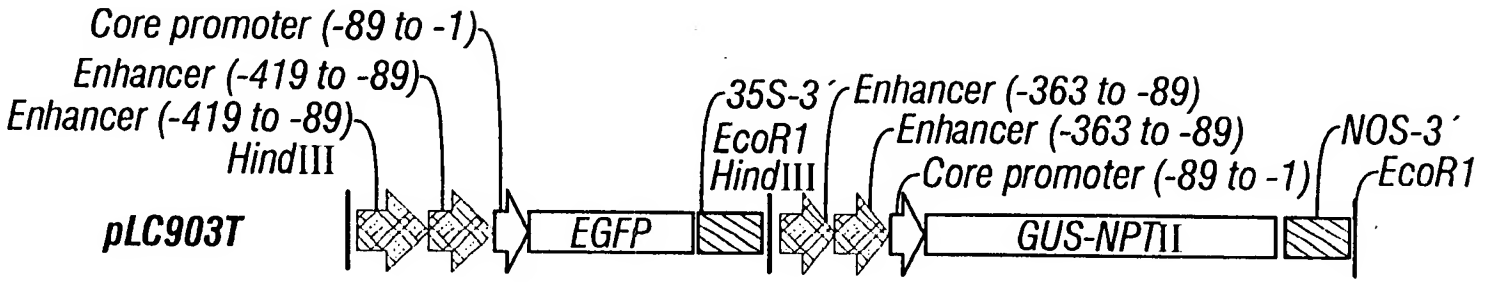


FIG. 26A

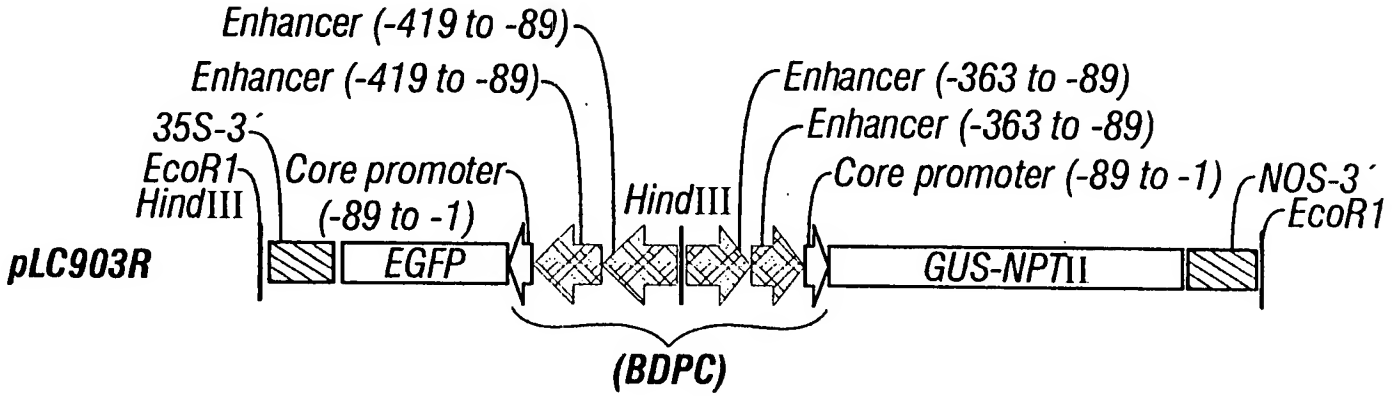


FIG. 26B

OIPE
AUG 22 2002
PATENT & TRADEMARK OFFICE
JC181

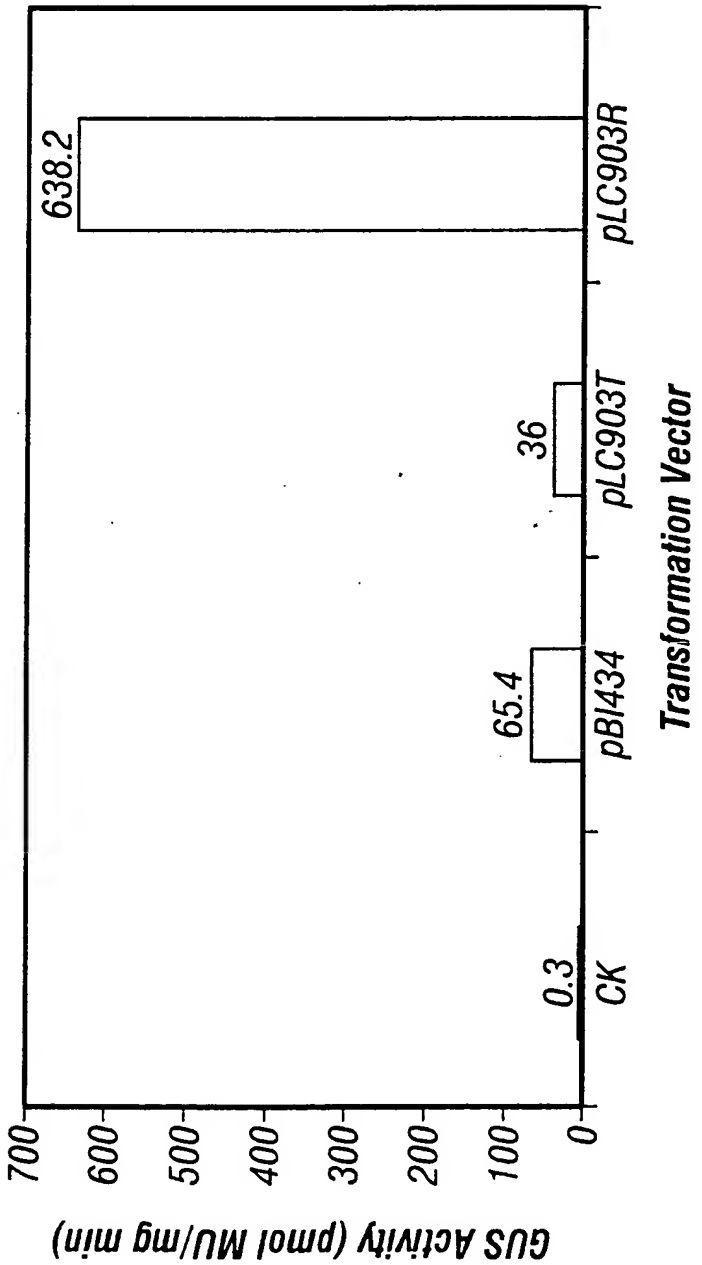


FIG. 27